A MEMORANDUM

DATE: March 11, 2022

TO: UCCC Members

FROM: Dr. Andy Perkins, Chair

SUBJECT: UCCC Meeting on Friday, March 25, 2022 at 1:30 p.m.

The agenda and proposals for the meeting on **Friday, March 25, 2022 at 1:30 p.m. in the Trotter Room (Room 2200) of the Center for Advanced Vehicular Systems in the Research Park** are enclosed**.** The minutes will be forwarded by a separate email. Please contact the UCCC Office if you are unable to attend the meeting.

Thank you.

Enclosures: Course/Curriculum Proposals

Summary of Recommended Changes:

Change 1: Amend the Non-Voting Members to accurately reflect the current names of the various offices and centers.

Change 2: Add Center for Distance Education, Center for Teaching and Learning, University Academic Advising Center, and Office of Research and Economic Development (as pertains to curriculum related issues with Centers and faculty research) and correct the name of Office of Institutional Research and Effectiveness (one entity).

Change 3: Stipulate that Officers shall include a Vice-Chair to be elected by membership.

Current By-Law:

ARTICLE III COMPOSITION

The UCCC membership shall include voting faculty members, three voting student members and additional non-voting representatives as listed below.

Section 3 The non-voting members shall be:

A. A representative of the Registrar's Office.
B. A representative of the Library.
C. The Secretary employed for the UCCC.
D. A representative of the Office of Research and Institutional Effectiveness.
E. A representative of the Information Technology Services.
F. A representative of the Graduate School.
G. A representative of the Office of Institutional Research.

Recommended Revision:

Section 3 The non-voting members shall be:

A. A representative of the Registrar's Office.
B. A representative of the Library.
C. The Secretary employed for the UCCC.
D. A representative of the Office of Institutional Research and Effectiveness.
E. A representative of the Information Technology Services.
F. A representative of the Graduate School.
G. ~~A representative of the Office of Institutional Research.~~
G. A representative of the Center for Distance Education.
H. A representative of the Center for Teaching and Learning.
I. A representative of the University Academic and Advising Center.
J. A representative of the Office of Research and Economic Development

Current By-Law:

ARTICLE VI OFFICERS

Section 1 The officers of the UCCC shall be a Chair and a Secretary.
Chair- to preside at all meetings of the UCCC and represent the UCCC to the University. The Chair shall be elected annually at the January meeting by the members of the UCCC. The Chair shall be a current, elected member of the UCCC with a minimum of one year's experience on the UCCC. The Chair's term shall be from July 1 to June 30 of the school year of election. The Chair shall receive 25% released time to perform the duties of the Chair in reviewing proposals, advising colleges and departments concerning proposals and establishing meeting times and agendas. In the event that the Chair cannot preside at a called meeting, the Secretary will serve as the presiding officer.

Secretary- the Secretary shall be a paid employee of the University with responsibility for managing the UCCC office and assisting the UCCC Chair.

Recommended Revision:

ARTICLE VI OFFICERS

Section 1 The officers of the UCCC shall be a Chair, Vice-Chair and a Secretary.

Chair- to preside at all meetings of the UCCC and represent the UCCC to the University. The Chair shall be elected annually at the January meeting by the members of the UCCC. The Chair shall be a current, elected member of the UCCC with a minimum of one year's experience on the UCCC. The Chair's term shall be from July 1 to June 30 of the school year of election. The Chair shall receive 25% released time to perform the duties of the Chair in reviewing proposals, advising colleges and departments concerning proposals, ~~and~~ establishing meeting times and agendas and attending Associate Deans Council. In the event that the Chair cannot preside at a called meeting, the ~~Secretary~~ Vice-Chair will serve as the presiding officer.

Vice-Chair- to assist the Chair in the execution of duties related to UCCC. The Vice-Chair shall be elected annually at the January meeting by the members of the UCCC. The Vice-Chair shall be a current, elected member of the UCCC with a minimum of one year's experience on the UCCC. The Vice Chair's term shall be from July 1 to June 30 of the school year of election. In the event that the Chair cannot preside at a called meeting, the Vice-Chair will serve as the presiding officer.

Secretary- the Secretary shall be a paid employee of the University with responsibility for managing the UCCC office and assisting the UCCC Chair.

UNIVERSITY COMMITTEE ON COURSES AND CURRICULA
March 25, 2022

1. **Welcome**
2. **Approval of minutes**
3. **Proposed modification of By-Laws**
4. **Course proposals by college/school**

ACADEMIC AFFAIRS

Addition	DSCI 2012	Data Science Lab1: Data Wrangling
Addition +Gen. Ed. +Meridian +Online/Distance +Study Abroad	DSCI 2013	Data Science Literacy (was tabled at February 18, 2022 meeting)
Addition	DSCI 2022	Data Science Lab 5: Cloud, High-Performance, and Quantum Computing
Addition	DSCI 3012	Data Science Lab 2: Description, Analysis, and Interference
Addition	DSCI 3013	Fundamentals of Data Acquisition
Addition	DSCI 3022	Data Science Lab 3: Data Visualization
Addition	DSCI 3032	Data Science Lab 4: Artificial Intelligence
Addition +Meridian +Online/Distance +Study Abroad	DSCI 4013	Data Visualization
Addition	DSCI 4553	Data Science Capstone 1
Addition	DSCI 4663	Data Science Capstone 2
Addition +Online/Distance	DSCI 8013	Data Science Literacy Pedagogy1: Governance, Ethics, and Data Science Applications
Addition +Online/Distance	DSCI 8023	Data Science Literacy Pedagogy 2: Technical Overview of Data Science Methods and Strategies
Addition +Online/Distance	DSCI 8033	Data Science Classroom Integration

AGRICULTURE AND LIFE SCIENCES

Addition +Online/Distance	EPP 6273 (split level with 4273)	Honey Bee Biology and Beekeeping
Addition +Online/Distance	FDM 3583	Excel and Retail Operations
Modification	FDM 8100	Creative Component Project in Fashion Design and Merchandising
Addition +Online/Distance	FNH 2201	Nutrition and Dietetics Career Planning
Addition +Online/Distance	FNH 4323	Professional Skills for Nutrition and Dietetics
Modification +Online/Distance	FNH 8243	Public Health Nutrition
Addition +Online/Distance	HDFS 8523	Assessment Practices in Early Intervention

Addition +Online/Distance	PSS 4473/6473	Hydroponic and Soilless Crop Production
+Online/Distance	PSS 4553/6553	Plant Growth and Development
Modification +Campus 1	PSS 6013 (split level with PSS 4013)	Principles of Floral Design II
Modification +Online/Distance	PSS 8553	Phytohormones and Growth Regulation
Modification +Online/Distance	PSS 8811	Graduate Seminar
Modification +Online/Distance	PSS 8821	Graduate Seminar
Modification +Online/Distance	PSS 8831	Graduate Seminar

ARCHITECTURE, ART AND DESIGN

Modification	ARC 2713	Environmental Building Systems I (already approved for Gen. Ed.)
Modification	ARC 3723	Environmental Building Systems II
Addition + Gen. Ed.	ART 2063	Global Contemporary Art
Addition	ART 4153	Art in the City
Modification +Gen. Ed.	BCS 2713	Environmental Building Systems I
Modification +Online/Distance	BCS 3723	Environmental Building Systems II
Addition	ID 4773/6733	Historic Lighting Environments

ARTS AND SCIENCES

Addition	AN 3563	Data Analytics for Anthropology
+Online/Distance	EN 2503	Teaching Grammar
Modification	EN 4903/6903	Nineteenth-Century U.S. Literature
+Online/Distance	FLI 1123	Italian II
Addition	FLI 3233	Advanced Italian Conversation
Addition	GG 4643	Structural Geology for Industry Applications
Addition +Online/Distance	PPA 8164	Strategic Change and Management
Addition +Online/Distance	PPA 8843	Introduction to Public Procurement
Addition +Online/Distance	PPA 8853	Contract Formation in Public Procurement
Addition +Online/Distance	PPA 8863	Contract Administration in Public Procurement
Addition +Online/Distance	PPA 8873	Legal, Ethical, and Socially Responsible Aspects of Public Procurement
Addition +Online/Distance	PPA 8893	Women in Public Administration
Addition	SJ 1303	Introduction to Social Justice Studies

EDUCATION

Modification +Online/Distance	EDF 3413	Writing for Thinking

Addition +Online/Distance	INDT 1001	Introduction to Industrial Technology
Addition +Online/Distance	INDT 1003	Technical Drafting Print Reading
Addition +Online/Distance	INDT 1133	Introduction to PTEC
Modification	INDT 1813	Basic Industrial Electricity and Electronics
Modification	INDT 2343	Parametric Modeling for 3D Design
Modification	INDT 2353	Industrial Computer Aided Drafting and Design
Addition +Online/Distance	INDT 2533	Processing of Oil and Gas
Modification	INDT 3043	Industrial Safety
Addition +Online/Distance	INDT 3101	Junior Seminar
Modification	INDT 3103	Advanced Industrial Electricity and Electronics
Addition +Online/Distance	INDT 3133	Process Equipment and Instrumentation
Addition +Online/Distance	INDT 3233	Process Systems and Operations
Addition +Online/Distance	INDT 3323	Welding Technology II
Addition +Online/Distance	INDT 3333	Process Quality and Troubleshooting
Addition +Online/Distance	INDT 3703	Principles of Packaging
Addition +Online/Distance	INDT 3713	Packaging Materials
Addition +Online/Distance	INDT 3753	Introduction to Industrial Coatings
Modification	INDT 3813	Technical Writing Presentation for Industry
Addition +Online/Distance	INDT 3853	Introduction to Powder Coatings
Addition +Online/Distance	INDT 3863	Introduction to Liquid Coatings
Addition +Online/Distance	INDT 3873	Introduction to E-Coatings
Modification	INDT 4223/6223	Quality Assurance
Addition +Online/Distance	INDT 4243	System Design for Industrial Finishing Applications
Addition +Online/Distance	INDT 4443	Additive Manufacturing Rapid Prototyping
Addition +Online/Distance	INDT 4703	Sustainable Packaging
Addition +Online/Distance	INDT 4713	Healthcare Food Packaging
Modification	MUA 1750	Applied Organ
Modification	MUA 2750	Applied Organ
Modification	MUA 3750	Applied Organ
Addition	PE 1281	Self-Defense

ENGINEERING

Addition	ABE 4463	Introduction to Imaging in Biological Systems
Modification	CE 4563/6563	Sedimentation Engineering
Modification +Online/Distance	CE 4583/6583	Stream Restoration
Modification	CSE 3724	Computer Organization (already approved for distance)
Modification	CSE 4273/6273	Introduction to Computer Forensics (already approved for distance)
Modification	CSE 4733/6733	Operating Systems I (already approved for distance)
+Online/Distance	ECE 3714	Digital Devices and Logic Design (tabled at 1/14/2022 meeting)
+Online/Distance	ECE 3724	Miniprocessors (tabled at 1/14/2022 meeting)
+Online/Distance	IE 4553/6553	Engineering Law and Ethics
Modification	ME 2133	Modeling and Manufacturing

5. Degree proposals by college/school

ACADEMIC AFFAIRS

Addition	BS	Data Science
Addition	Certificate (Graduate)	Data Science

AGRICULTURE AND LIFE SCIENCES

Modification	BS	Food Science, Nutrition and Health Promotion
+Distance	MS	Plant and Soil Sciences/Agronomy; Horticulture; Weed Science
+Distance	PhD	Plant and Soil Sciences/Agronomy; Horticulture; Weed Science
Modification	MS	Fashion Design and Merchandising
Modification	PhD	Biomedical Engineering

ARCHITECTURE, ART AND DESIGN

Modification	BArch	Architecture
Modification	BS	Building Construction Science

EDUCATION

Modification	Ed.D.	Education
Modification	PhD	Counselor Education and Student Counseling & Guidance

ENGINEERING

Modification	BS	Computer Engineering
Modification	BS	Electrical Engineering
Modification	MS	Cyber Security and Operations
Modification	MS	Industrial and Systems Engineering
Modification	PhD	Electrical and Computer Engineering

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: Academic Affair Department: Office of the Provost and executive Vice President

Contact Person: Dr. Mimmo Parisi **Mail Stop:** 9723 **Email:** m.parisi@msstate.edu
Nature of Change: New Degree **Date Initiated:** 03/10/22 **Effective Date:** Fall 2022

New Degree Program Name: Bachelor of Science

Major: Data Science **Concentration:** The degree will offer 9 concentrations.

Summary of Proposed Changes:
The Office of the Provost and Executive Vice President requests that a new BS degree program in Data Science be offered.

Approved:	**Date:**
Department Head	03/07/2022
N/A	
Chair, College or School Curriculum Committee	
Peter L. Ryan	9th March, 2022.
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

NEW DEGREE OUTLINE FORM

Use the chart below to indicate your new degree outline. If any General Education (Core) course is acceptable in the category, please indicate by saying "any Gen Ed course". There is no need to type in the whole list. Expand rows as needed.

PROPOSED New Degree

Degree: Bachelor of Science
Major: Data Science
Concentrations:

1. Visualization and Visual Analytics for Built Environment: College of Architecture, Art, and Design
2. Computational Agriculture and Natural Resources: College of Agriculture and Life Sciences and the College of Forest Resources
3. Business Information Systems: College of Business
4. Marketing and Supply Chain Analysis: College of Business
5. Social Data Analysis: College of Arts and Sciences
6. Psychoinformatics: College of Arts and Sciences
7. Statistical Modeling: College of Arts and Sciences
8. Computational Intelligence: Bagley College of Engineering
9. Geoinformatics: College of Arts and Sciences

New Degree Description

The Bachelor of Science in Data Science is an interdisciplinary program that draws upon disciplines from multiple colleges. It is a 123-hour inter-college program designed to include three general areas of coursework: general education, program core, and applications of the data science fundamentals in specific body of knowledge such as geoinformatics, computational intelligence and cybersecurity, marketing, management information systems, statistical modeling, social science analytics, architectural design and built environment, and smart agriculture. The overall curriculum is designed to provide students with an ideal educational experience necessary to become effective professional data science experts. Under the proposed undergraduate curriculum, general education coursework will help data science students develop intellectual curiosity, critical thinking, and ethical and aesthetic awareness. The coursework for the core program will provide students with the opportunity to build a strong foundation in the key fields of data science that include computer science, mathematics and statistics, management information systems, communication, management / leadership, design, and ethics. The course sequences for several distinct areas of academic concentration will provide students with the opportunity to become data science experts in a specific area.

Concentration Description

a. The Visualization and Visual Analytics for Built Environment concentration focuses on visualization techniques and smart analytics to leverage data across the full project lifecycle from design development, construction, and operations to increase efficiency and enhance productivity. The design and construction process for the built environment is rapidly transforming, driven by two primary forces. Architects and designers are increasingly adopting Building Information Modeling (BIM) techniques that allow more sustainable, accurate, and efficient design, planning,

evaluation, and construction of the built environment. Rapid integration of IoT sensors and intelligent building systems that track every aspect of building performance complements the digital revolution in the design process. However, the data visualization and analytics efforts have significantly lagged behind data capture efforts by integrating IoT sensors in smart buildings. This gap presents an opportunity for a new class of professionals at the intersection of data science and design visualization. The industry needs new professionals who can bring together computational statistics and data analytic skills with visualization skills to inform the development of new workflows and strategies for the design and construction industries. Courses in this concentration train aim to fill this gap by preparing students in three complementary areas:

- Provide a foundation in basic principles of design and digital representation drawing from traditional art and design disciplines
- Develop advanced design visualization skills using state-of-the-art computer-aided design (CAD) and building information modeling (BIM) software tools used in the architecture, engineering, and construction industries
- Develop an understanding of advanced building systems and building performance simulations and evaluations

The fundamental discipline courses in this concentration thus introduce visualization and analytics techniques that support the entire building project lifecycle from design development, construction, and operation to increase efficiency and enhance performance. The two data science capstone projects for this concentration provide opportunities to engage in real-world problem-based learning by bringing together foundational data science skills with visualization and analytic skills developed as part of the concentration.

b. The Computational Agriculture and Natural Resources (CANR) concentration trains students interested in data-driven careers in agriculture and natural resources through subject matter and applied data science coursework. Students who complete the CANR concentration will be equipped for careers as data science experts in agricultural production, agricultural technology, agricultural finance, natural resource management, wildlife and fisheries science, plant science, and other related fields.

c. Business Information Systems focuses on applying data science to solve business problems in the context of digital transformation. Modern enterprise management presents complex challenges of identifying actionable knowledge derived from the emerging flood of new data captured by an exploding number of online processes and connected sensors and devices. Companies are redesigning their organizational structures and processes to leverage this new capability – the concentration in BIS will prepare students to play a leading role in this emerging digital transformation and help companies compete in the increasingly connected environment. Students will combine their in-depth understanding of business processes with the ability to apply data science techniques to analyze business data, enabling them to aid strategic decision making. The concentration in BIS prepares students to solve business problems and identify business opportunities in the context of intelligent data analytics and digital transformation. Students will master these skills through learning exercises and real-world projects, engaging in projects to develop and implement a data-driven decision process or solution based on data mining, artificial intelligence, machine learning, and knowledge discovery of hidden relationships that can be exploited for new advances in business strategy. This experiential learning approach enables students to leverage their skillsets in a contextualized environment, complete with project management requirements, cost-benefit trade-offs, implementation obstacles (including financial, political, administrative, temporal, and legal barriers), team building and culture-building requirements, progress measurement methods, and complete life-cycle management of data science projects.

d. Marketing and Supply Chain Analytics focuses on applying data science to solve problems relating to marketing and supply chain management using digital technologies. Marketing and supply chain functions are increasingly driven by data. Tasks such as analyzing online social media content, planning advertising campaigns across multiple online channels, designing cutting edge products, and delivering products through complex global supply chains, all require cutting edge data

analytics skills. The concentration in Marketing and Supply Chain Analytics prepares students to solve data-driven business problems relating to marketing and supply chain management. Fundamental discipline courses expose students to important principles in business. Core concentration courses include upper-level courses focused on marketing and supply-chain analytics. There is a strong focus on practical project-driven learning in this concentration, with several classes offering the chance to working on projects for local companies and non-profit organizations.

e. Social Data Analytics focuses on applying data science to understand sociological and political aspects of social media communication. Social Data Analytics prepares students to apply data science to understand sociological and political aspects of social media communication. Fundamental discipline courses lay discipline-specific foundations in social science. Core concentration courses prepare students for more advanced work with social media sources.

f. Psych informatics is subfield of phycology for the acquisition, organization, and synthesis of data collected from psychology to reveal information about psychological traits such as personality and mood. Psychology has historically relied on experiments and questionnaires to collect data. These methods face several disadvantages such as small number of participants and bias and unreliable memory. Psych informatics solves these problems by storing Big Data related to psychology (such as communications on smartphones or social media websites) and then data mining for relevant psychological information. This concentration prepares students to apply data science to the field of psychology. Fundamental discipline courses lay discipline-specific foundations in psychology. Core concentration courses prepare students for more advanced work with cognitive science and psychology. Students in the Psychology concentration are recommended to take PSY 1013 as their second required social science general education course.

g. The Statistical Modeling concentration prepares students to apply advanced statistical methods to build analytical and statistical models. Core concentration courses prepare students for more advanced work in statistics. The concentration focuses on statistical models and methods that are needed to discover and validate patterns in Big Data. It includes upper-levels statistics and mathematics courses and a two-semester practicum to apply the theoretical machinery of quantitative methods to the solution of real-world problems involving Big-Data.

h. Computational Intelligence focuses on understanding artificial intelligence and machine learning approaches to develop effective strategies to solve large-scale data science problems. This includes creation of new software tools, algorithms, and using existing programs and libraries. The concentration includes foundational courses in software development, algorithms, artificial intelligence, and machine learning. These ideas are then applied in various computer science-related contexts in upper-level courses and in a two-semester practicum.

i. The Geoinformatics concentration includes courses in three categories within the Department of Geosciences, comprising a total of 30 hours, with a focus on geospatial data acquisition and analysis. This includes nine hours of required coursework related to: (1) statistical analysis of geospatial data, (2) analysis and visualization of spatial data using Geographic Information Systems (GIS), and (3) acquisition of spatial information from remote sensing platforms. A further 15 hours will consist of courses in meteorology/climatology, geospatial science, and/or geology, with specific courses chosen based on student interest. These courses serve as the basis for attaining core knowledge on the nature and processes related to geoscience data, which is critical for applying data science skills in an appropriate and representative way with respect to geospatial information. The courses also act to showcase the specific applications of data science within the geoscience community, which will help students define future research strategies and interests as well as prepare them for careers as data scientists and geoinformatics professionals. The final six-hour capstone course will provide a means to apply general and discipline-specific data science skills by working directly with one or more geoscience research faculty. The course will involve designing and completing a research-based project that requires acquiring, analyzing, and interpreting geospatial information using sound scientific principles and critical thinking. By

completing the Geoinformatics concentration within the Data Science BS, students will learn not only the skills and techniques required to be successful data scientists within the geospatial community, but also the knowledge necessary to make critical and relevant decisions within the scientific fields that rely on the collection and interpretation of spatial information.

Proposed Curriculum Outline	Required Hours
English (General Education): EN 1103 English Comp I or EN 1104 Expanded English Comp I EN 1113 English Comp II or EN 1173 Accelerated Comp II	6
Fine Arts (General Education): Any Gen Ed course	3
Natural Sciences (2 labs required from Gen Ed): Any Gen Ed course	6
Math (General Education): MA 1713 Calculus I MA 1723 Calculus II MA 2733 Calculus III	9
Humanities (General Education): PHI 1113 Intro to Logic (required) -Any Gen Ed course	6
Social/Behavioral Sciences (Gen Ed): DSCI 2013 Data Science Literacy (required) -Any Gen Ed course	6
Oral Communication: *CO 3213 Small Group Communication*	3
Technical Writing: *CO 3223 Comm & Media Studies Research Methods*	3
Major Core: Mathematics and Statistics: MA/ST 3121 Introduction to Statistical Inference MA 3113 Introduction to Linear Algebra MA/ST 4523 Introduction to Probability	9

Major Core: Computer Science and Engineering: CSE 1284 Introduction to Computer Programming CSE 1384 Intermediate Computer Programming CSE 2813 Discrete Structures CSE 2383 Data Structures and Analysis of Algorithms CSE 4503 Database Management Systems CSE 4633 Artificial Intelligence CSE 3763 Legal and Ethical Issues in Computing	23
Major Core: Business Information Systems: BIS 3233 Management Information Systems	3
Major Core: Data Science Proper: DSCI 3013 Fundamentals of Data Acquisition DSCI 2012 Data Science Lab 1 - Data Wrangling DSCI 3012 Data Science Lab 2 – Description, Analysis, and Inference DSCI 3022 Data Science Lab 3 – Data Visualization DSCI 3032 Data Science Lab 4 - Artificial Intelligence DSCI 2022 Data Science Lab 5 - Cloud, Quantum, and High-Performance Computing DSCI 4013 Data Visualization	16
Concentration Courses: The Coursework is reported below Each area of concentration combines fundamental, field-specific content, concentration electives designed to apply data science to the field, and a six-hour practicum/capstone project. On their third year, students will have the opportunity to select a concentration area from the several available areas offered by the different colleges on campus.	30
Total Hours	123

Concentration Coursework

Visualization and Visual Analytics for Built Environment

Category	Courses	Hours
Fundamental Discipline Courses	Complete EIGHT 3-credit courses out of the following TEN: • ART 1123 Design I (2D) • ART 2803 Intro to Comp. Art • ART 2813 Intermediate Computing for Design • ART 4813 Multimedia I • BCS 2313 Virtual Design & Construction • ID 3603 Digital Design for Interiors • ID 3363 3D CAD Modeling • ARC 2713 Passive Bldg. Systems • ARC 3723 Active Bldg. Systems • ARC 4633 Architecture and Virtual Spaces	24
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data	6

	Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	
	Total	30

Computational Agriculture and Natural Resources

Category	Courses	Hours
Fundamental Discipline Courses	Choose 1 Course from the Following: • AEC 2713 Introduction to Food and Resource Economics • ABE 1863 Engineering Technology in Agriculture • BCH 4013 Principles of Biochemistry • PSS 1313 Plant Science • ADS 1113 Animal Science Choose 1 Course from the Following: • SBP 1103 Introduction to Sustainable Bioproducts • WFA 3133 Applied Ecology • FO 4123 Forest Ecology	6
Core Concentration Courses	Choose 6 Credit Hours from the Following: **CALS:** • EC 2113 Principles of Macroeconomics • EC 3123 Intermediate Microeconomics • AEC 2223 Introduction to Sustainability Economics • AEC 3133 Introductory Agribusiness Management • AEC 3233 Introduction to Environmental Economics and Policy • AEC 4123 Financial and Commodity Futures Marketing • ABE 2173 Principles of Agricultural and Off-Road Machines • ABE 2543 Precision Agriculture I • ABE 4543 Precision Agriculture II • BCH 3102 Essential Biochemical Concepts and Analysis • BCH 4414 Protein Methods • ADS 3013 Anatomy and Physiology • ADS 3313 Introduction to Meat Science **CFR:** • SBP 2012 Intro to Bioproducts Industries • SBP 2123 Materials and Processing of Structure Bioproducts • WFA 4313 Fisheries Management • WFA 4613 Landscape Ecology • FO 2213 Forest Measurements • FO 2443 Essentials of Biotechnology • FO 4113 Forest Resource Economics • FO 4123 Forest Ecology	6
Applied Courses	Choose 12 Credit Hours from the Following: **CALS:** • AEC 4133 Analysis of Food Markets and Prices • AEC 4223 Applied Quantitative Analysis in Agricultural Economics	12

	• AEC 4363 Economics of Precision Agriculture • AEC 4413 Public Problems of Agriculture • AEC 4733 Econometric Analysis in Agricultural Economics • ABE 2873 Land Surveying • ABE 3513 The Global Positional System and Geographic Information Systems in Agriculture and Engineering • ABE 4163 Machine Management Agro-Ecosystems • ABE 4263 Soil and Water Management • ABE 4463 Introduction to Imaging in Biological Systems • ABE 4483 Introduction to Remote Sensing Technologies • BCH 4803 Integrative Protein Evolution • PSS 4483 Introduction to Remote Sensing Technologies • ADS 4523 Internet Based Management in Livestock Industries **CFR:** • SBP 4013 Wood Anatomy • SBP 4253 Quantitative Methods in SBP • WFA 4123 Wildlife and Fisheries Biometrics • WFA 4243 Wildlife Techniques • WFA 4253 Application of Spatial Technologies to Wildlife Fisheries Management • FO 3015 Forest Description and Analysis • FO 4213 Forest Biometrics • FO 4313 Spatial Techniques in Natural Resources Management • FO 4453 Remote Sensing Applications • FO 4473 GIS for Natural Resource Management	
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	**30**

Business Information Systems

Category	Courses	Hours
Fundamental Discipline Courses	Students will choose three courses from the following: • BL 2413 Legal Environment of Business • ACC 2013 Financial Accounting • ACC 2023 Managerial Accounting • EC 2113 Macro Economics • EC 2123 Macro Economics • FIN 3123 Financial Management • MGT 3113 Principles of Management • MKT 3013 Principles of Marketing • MKT 3323 International Logistics	9
Core Concentration Courses	• BQA 4423 Business Decision Analysis • BIS 4533 Decision Support Systems • BIS 4113 BIS Security Management • BIS 4753 Structured Systems Analysis and Design	15

	In addition, students will choose an elective from one 4000-level business course.	
Capstone	Students will Register for the Following: • BIS 4763 BIS Senior Seminar (analytics project) • BQA 4413 Business Forecasting & Predictive Analytics	6
	Total	30

Marketing and Supply Chain Analytics

Category	Courses	Hours
Fundamental Discipline Courses	Students will take the following 2 Courses: • MKT 3013 Principles of Marketing • MKT 3323 International Logistics Students will choose two courses from the following: • BL 2413 Legal Environment of Business • ACC 2013 Financial Accounting • ACC 2023 Managerial Accounting • EC 2113 Macro Economics • EC 2123 Macro Economics • FIN 3123 Financial Management • MGT 3113 Principles of Management	12
Core Concentration Courses	Students will choose four courses from the following list. • BQA 4423 Business Decision Analysis • BIS 4533 Decision Support Systems • MKT 4533 Marketing Research • MKT 4213 Internet Marketing • MKT 4033 International Transportation • MKT 4013 Procurement • MKT 4313 Physical Distribution Management	12
Capstone	Students will Register for the Following: • MKT 4333 International Supply Chain Management • BQA 4413 Business Forecasting & Predictive Analytics	6
	Total	30

Social Data Analytics

Category	Courses	Hours
Fundamental Discipline Courses	From the following courses, choose 9 hours, but no more than 6 hours in any one field: • AN 1103 Intro to Anthropology • AN 1143 Intro to Cultural Anthropology • AN 1344 Intro to Bio Anthropology • CO 1403 Intro to Mass Media • GR 2313 Maps and Remote Sensing	9

	• PS 1313 Intro to International Relations • PS 1513 Comparative Government • PS 2703 Intro to Public Policy • CRM 1003 Crime and Justice in America • SO 1003 Intro to Sociology • SO 1103 Contemporary Social Problems	
Core Concentration Courses	Choose 15 hours from the following 3-hour courses: • AN 3343 Intro to Forensic Anthropology • AN 4173 Environment and Society • AN 4163 Anthropology of International Development • AN 4323 Plagues and People • CO 4213 Political Communication • CO 4283 Health Communication • CRM 4253 White Collar and Computer Crime • GR 3303 Survey of Geospatial Technologies • GR 4123 Urban Geography • PS 4243 State Election Policy and Politics • PS 4283 Public Opinion • PS 4293 Political Behavior • PS 4343 International Conflict and Security • PS 4373 International Terrorism • PS 4464 Political Analysis • PS 4523 Democracy and Inequality • PS 4613 Civil Wars and Intra-State Conflict • SO 3303 Rural Sociology • SO 4113 Social Organization and Change • SO 4123 Poverty, Analysis: People, Organization, and Program • SO 4173 Environment and Society	15
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Psychoinformatics

Category	Courses	Hours
Fundamental Discipline Courses	• PSY 1021 Careers in Psychology • PSY 3104 Introductory Psychological Stats • PSY 3314 Experimental Psychology	9
Core Concentration Courses	Choose 9 hours from the following 3-hour courses: • PSY 3343 Psychology of Learning • PSY 3623 Social Psychology • PSY 3713 Cognitive Psychology • PSY 3803 Intro to Developmental Psych • PSY 4403 Biological Psychology Choose 6 hours from among any of the 4000 level Psychology courses.	15
Capstone	• PSY 4000 Directed Individual Study in Psychology	6

	Students must perform research in a laboratory and present their capstone project at the Undergraduate Research Symposium.	
	Total	30

Statistical Modeling

Category	Courses	Hours
Core Concentration Courses	Complete 24 hours from the following 3-hour courses: • MA 2923 Intro. to Modern Scientific Computing • MA 4183 Math. Found. of Machine Learning • MA 4133 Discrete Mathematics • MA 4143 Graph Theory • ST 4213 Nonparametric • ST 4313 Intro to Spatial Statistics • ST 4543 Intro to Mathematical Statistics I • ST 4243 Data Analysis I	24
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Computational Intelligence

Category	Courses	Hours
Core Concentration Courses	• CSE 2213 Methods & Tools in Software Development • CSE 4163 Designing Parallel Algorithms • CSE 4683 Machine Learning and Soft Computing • CSE 4833 Introduction to Algorithms • CSE 4643 AI Robotics • CSE 4623 Computational Biology • CSE 4653 Cognitive Science • CSE 4293 Artificial Intelligence for Cybersecurity	24
Capstone	• DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Geoinformatics

Category	Courses	Hours

Fundamental Discipline Courses	Required courses (9 hours)
	• GR 4303 Principles of GIS[2]
	• Choose one of the following:
	  ○ GR 4333 Remote Sensing of the Physical Environment[2]
	  ○ GR 4783 Satellite Meteorology
	  ○ GR 4883 Radar Meteorology
		9

	• GR 4633 Statistical Climatology	
Core Concentration Courses	Elective courses (15 hours – choose 5 from the following) • GR 4733 Synoptic Meteorology • GR 4643 Physical Meteorology and Climatology I • GR 4693 Physical Meteorology and Climatology II • GR 4613 Applied Climatology • GR 4783 Satellite Meteorology[1] • GR 4883 Radar Meteorology[1] • GR 4553 Computer Methods in Meteorology • GR 4313 Advanced GIS[2] • GR 4323 Cartographic Sciences[2] • GR 4333 Remote Sensing of the Physical Environment[1,2] • GR 4343 Advanced Remote Sensing[2] • GR 4363 GIS Programming[2] • GR 4123 Urban Geography • GG 3613 Water Resources • GG 4233 Applied Geophysics • GG 4413 Structural Geology • GG 4503 Geomorphology • GG 4523 Coastal Environments • GG 4543 Community Engagement in Geosciences • GG 4613 Physical Hydrogeology [1] Can be used as remaining hours if not already used for the required concentration [2] Counts towards the Geospatial and Remote Sensing Minor	15
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

STUDENT LEARNING OUTCOMES AND ASSESSMENT

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply theory, techniques, and tools throughout the data science lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.
7. Understand how to create a culture and leadership environment for innovation that puts the practice of data science at the core source of the economic and cultural vitality of an organization to ensure success in the process of digital transformation.
8. Understand, construct, evaluate, and choose data-enabled predictive models using state-of-the-art artificial intelligence, machine learning, statistical modeling, and model evaluation methods.

Assessment will be realized through the Institutional Effectiveness report process. External reviewers will also be identified to conduct periodic self-studies and, when possible, to seek accreditation through the ABET Computing Accrediting Commission or other accreditation bodies relevant to establishing the overall quality of the program.

SUPPORT – Letters of support from the Senior Advisor for Data Science Development and 9 Deans
PROPOSED 4-LETTER ABBRIAVIATION DSCI
EFFECTIVE DATE Fall 2022
CIP NIMBER 30.7001

Appendix 8: New Degree Program Proposal

Institution: Mississippi State University

Date of Implementation:	**Incremental, Five-Year Cost of Implementation: $ 3,459,300**	**Incremental, Five-Year Per Student Cost of Implementation: $ 8,437**
Fall 2022		
Will it attract new students to the university? ☒ **Yes** ☐ **No**	**Potential Five-Year, New Revenue:** **$ 8,283930**	**Potential New, Five-Year Revenue Per Student:** **$ 20,204**

Program Title as will Appear on Academic Program Inventory, Diploma, and Transcript:	**Six-Digit CIP Code:**
Bachelor of Science with a Major in Data Science	30.7001

Name of Degree(s) to be Awarded:	**Total Credit Hour Requirements to earn the degree:**
Bachelor of Science with a Major in Data Science	123

List any institutions within the state offering similar programs:
No other university in Mississippi is currently offering a Bachelor of Science in Data Science. Furthermore, no institution is offering a B.S. in Data Science that covers the five major disciplines within the field of data science as core program: (1) Computer Science, (2) Mathematics and Statistics, (3) Management Information Systems, (4) Communication, and (5) Management and Leadership. Mississippi State University would be the first institution to offer such a major. Mississippi State University currently offers a Master of Science in Data Science, an interdisciplinary program.

University of Mississippi has an undergraduate Computer Science emphasis area in Data Science. Jackson State University currently offers a post-baccalaureate certificate in Data Analytics.

Responsible Academic Unit(s):
Division of Academic Affairs
Office of the Provost and Executive Vice President

Institutional Contact: Peter L. Ryan / Mimmo Parisi
Phone: 662-325-3742
Email: ryan@provost.msstate.edu /

Check one of the boxes below related to SACSCOC Substantive Changes.

☒ **Proposed Program is Not a Substantive Change** ☐ **Proposed Program is a Substantive Change**

Number of Students Expected to Enroll in First Five Years:		**Number of Graduates Expected in First Five Years:**	
Year One	50	**Year One**	0
Year Two	80	**Year Two**	5
Year Three	80	**Year Three**	18
Year Four	100	**Year Four**	56
Year Five	100	**Year Five**	60
Total	410	**Total**	139

Program Summary:

Students pursuing the Bachelor of Science in Data Science at Mississippi State will have the opportunity to develop the knowledge and skills necessary to meet the growing demand for data science experts in the context of the ongoing digital transformation. Digital transformation is the process by which the physical world blends with or gets replaced by the digital world. An organization achieves digital transformation when Artificial Intelligence (AI) becomes an integral part of its operations. Yet AI cannot work without data.

In a digitally transformed world, data are the new oil, the necessary resource to power Artificial Intelligence (AI) and to extract new knowledge to advance human progress. Data and AI are changing the way we live, work, and learn. Data and AI are also broadly impacting public and private sector activity, from health and education to industrial and service sectors. As organizations and businesses turn to data solutions and AI strategies, they are also increasingly creating new positions relating to the practice of data science. In response to digital transformation, data science is a new emerging field that explores and advances methods, systems, and processes to:

- Represent the world as data objects;
- Extract insights about the world from these data objects and turn these insights into discoveries, decisions, and actions; and
- Create smart systems to perform tasks that have historically required human cognition and human decision-making abilities.

The Mississippi State Bachelor of Science in Data Science is an interdisciplinary program that draws upon disciplines from multiple colleges. It is a 123-hour Inter-College Program designed to include three general areas of coursework: general education, program core, and applications of the data science fundamentals in specific body of knowledge such as health informatic, geoinformatics, computational intelligence and cybersecurity, marketing, management information systems, statistical modeling, social science analytics, psych informatics, architectural design and built environment, and smart agriculture. The overall curriculum is designed to provide students with an ideal educational experience necessary to become effective professional data science experts. Under the proposed undergraduate curriculum, general education coursework will help prospect data science students develop intellectual curiosity, critical thinking, and ethical and aesthetic awareness. The coursework for the core program will provide students with the opportunity to build a strong foundation in the key fields of data science which include computer science, mathematics and statistics, management information systems, communication, management / leadership, design, and ethics. And the course sequences for several distinct areas of academic concentration will provide students with the opportunity to become data science experts in an area such as:

1. Visualization and Visual Analytics for Built Environment: College of Architecture, Art, and Design
2. Computational Agriculture and Natural Resources: College of Agriculture and Life Sciences and the College of Forest Resources
3. Business Information Systems: College of Business
4. Marketing and Supply Chain Analysis: College of Business
5. Social Data Analysis: College of Arts and Sciences
6. Psycho-informatics: College of Arts and Sciences
7. Statistical Modeling: College of Arts and Sciences
8. Computational Intelligence: Bagley College of Engineering
9. Geoinformatics: College of Arts and Sciences

Mississippi State University is seeking approval to offer this new degree program through both the in-person and the online (distance education) instructional modalities.

Chief Academic Officer Signature **Date**

Institutional Executive Officer Signature **Date**

Institution: Mississippi State University

1. **Describe how the degree program will be administered including the name and title of person(s) who will be responsible for curriculum development and ongoing program review.**

   The program will be administered through the Office of the Provost and Executive Vice President, by a program director, a program coordinator, and a student program advisor. An advisor from each college sponsoring an area of concentration will also be identified to ensure students formulate a sequence that considers prerequisites and necessary sequences. The program will be governed under the general direction of a university-wide Program Advisory Committee of the Faculty (hereafter, Advisory committee) with the Program Director as a member of the committee. The committee's general responsibility will be to provide oversight for the overall management of the program and to provide continuous review of the program to keep it current and relevant. The committee will be comprised of full-time or tenure-track faculty from each of the colleges on campus. Members will serve a three-year term. The committee will elect its own chair for a three-year term. Each college will develop a College Program Committee (hereafter, College committee) to recruit and advise their students on the concentrations and other course requirements for the degree. The College committee will also be responsible for programmatic decisions about the concentration area(s) and to maintain and keep the curriculum of their concentration area(s) current and relevant.

2. **Describe the educational objectives of the degree program including the specific objectives of any concentrations, emphases, options, specializations, tracks, etc.**

   The educational objectives of this new degree are:

   - Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply theory, techniques, and tools throughout the data science lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.
- Understand how to create a culture and leadership environment for innovation that puts the practice of data science at the core source of the economic and cultural vitality of an organization to ensure success in the process of digital transformation.
- Understand, construct, evaluate, and choose data-enabled predictive models using state-of-the-art artificial intelligence, machine learning, statistical modeling, and model evaluation methods.

3. Describe any special admission requirements for the degree program including any articulation agreements that have been negotiated or planned.

New Freshmen Admission
For regular admission to the Bachelor of Science in Data Science program as a freshman, students must be admitted to MSU and meet any one of the following criteria:

- Have a composite score greater than or equal to 23 on the ACT or 1130 on the SAT
- Have a composite score of 20, 21, or 22 on the ACT or between 1030 and 1120 on the SAT with a high school GPA of 3.0 or greater on academic core courses listed above
- Have an ACT or SAT score with a high school GPA of 3.5 or greater on academic core courses listed above.

New freshmen applicants who do not meet these requirements, are otherwise admitted to MSU, and want to pursue the BS in Data Science, should join the undeclared Data Science concentration. All students who are classified as Undeclared but plan to eventually move into the BS in Data Science must enroll in an appropriate math course each semester they are enrolled in this major.

To be successful in data science, a student must develop good math skills through courses in calculus, linear algebra, statistics, and other math topics. In data science, the first math course that applies to the degree is calculus. Taking calculus requires that a student have an adequate preparation in algebra, geometry, and trigonometry.

To provide students with the best possible opportunity for success in calculus, the Department of Mathematics and Statistics has established the following guidelines for placing students in math courses:

- MA 1713 Calculus I - have an ACT math sub-score of 26 or higher or have grades of C or better in MA 1313 College Algebra and MA 1323 Trigonometry or a C or better in MA 1453 Precalculus with Graphing Calculators.

- MA 1453 Precalculus with Graphing Calculators - have an ACT math sub-score of 24 or higher, or have a grade of C or better in MA 1313 College Algebra

- MA 1313 College Algebra - have an ACT math sub-score of 19 or higher

Students who are not prepared for Calculus I will be required to first complete Precalculus or a sequence of College Algebra and Trigonometry before taking calculus.

Internal Transfers
Undeclared and other students at Mississippi State University may be admitted into the BS in Data Science if they satisfy any one of the following criteria:

- Meet Data Science new freshmen requirements listed above.
- Have completed at least 30 hours with a cumulative GPA greater than or equal to 2.0 and passed Calculus I (MA 1713) with a grade of C or better.

External Transfers
Students may transfer from other colleges or universities into the MSU Data Science program if they meet all requirements to transfer to MSU and satisfy any one of the following criteria:

- Meet Data Science new freshmen admission standards listed above.
- Have completed at least 30 hours with a cumulative GPA greater than or equal to 2.0 and passed a course equivalent to Calculus I (MA 1713) with a grade of C or better.

Transfer students not meeting these requirements should join the undeclared Data Science concentration.

4. **Describe the professional accreditation that will be sought for this degree program. If a SACSCOC visit for substantive change will be necessary, please note.**

Data science draws on knowledge, skills and abilities from computer science, mathematics and statistics, management information systems, communication, management and leadership, and ethics all applied in the context of domains that make use of data. The interdisciplinary nature of data science calls for uniting traditionally separate disciplines into a coherent approach that produces effective data science experts. Recently, we have witnessed a growing interest in developing undergraduate data science programs around the country. Thus far, only a few undergraduate programs have been created. Currently, there is a set of proposed program standards by the Accreditation Board for Engineering and Technology (ABET) that is still under development. Under the ABET proposed program standards, the data science curriculum must provide graduates with the knowledge and skills to be able to apply theory, techniques, and tools throughout the data science lifecycle and to employ the results to satisfy stakeholders' needs.

According to ABET's draft standard, the curriculum must include:

1. Fundamental data science lifecycle topics:

a) Data acquisition and representativeness
b) Data management
c) Data preparation and integration
d) Data analysis
e) Model development and deployment
f) Visualization and communication of the knowledge obtained from the data

2. Concepts that span and are applied to the data science lifecycle:

a) Data ethics including legitimate use and algorithmic fairness
b) Governance including privacy, security, and stewardship
c) Statistical and mathematical topics including inference, modeling, linear algebra, probability, and optimization
d) Computing including data structures and algorithms

3. Advanced data science coursework that provides depth.

4. Coverage of at least one application area that provides context for data science activities.

5. A comprehensive project or experience that incorporates an application area and requires integration and application of knowledge and skills acquired in earlier course work.

The proposed data science program is designed to meet the draft standards for accreditation promulgated by the Computing Accreditation Commission of ABET, http://www.abet.org. Program accreditation will be sought as soon as final ABET standards are available, and accreditation is possible.

5. **Describe the curriculum for this degree program including the recommended course of study (appending course descriptions for all courses) and any special requirements such as clinical, field experience, community service, internships, practicum, a thesis, etc.**

All students will be required to complete 123 hours of coursework that includes: general education (30 Hours), program core (63 Hours), and course sequences from one of the available concentration areas (30 Hours).

General Education (30 Hours)

The general education component of the Bachelor of Science in Data Science follows the IHL and university general guidelines for a standard Bachelor of Science degree.

Category	Course	Hours
English	• EN 1103 English Comp I or • EN 1104 Expanded English Comp I	3
English	• EN 1113 English Comp II or • EN 1173 Accelerated Comp II	3
Fine Arts	1 Course from the following: • AAS 1103 African American Music • ARC 1013 Architectural Appreciation • ART 1013 Art History I • ART 1023 Art History II • ART 1113 Art Appreciation • CO 1503 Introduction to the Theatre • HON 3173 Honors Seminar in Fine Arts • ID 3643 History of Interiors I • LA 1803 Landscape Architecture Appreciation	3

	• MU 1103 African American Music • MU 1113 History and Appreciation of Music • MU 1123 History and Appreciation of American Music • MU 1133 The History of Rock and Roll • MU 1143 The History of Jazz • MU 1163 Introduction to Music in Film • MU 1173 Music of the Beatles • MU 2173 Women in Music • MU 3013 Survey of Western Music History I • PE 1323 History and Appreciation of Dance • PSS 2343 Floral Design • TKI 2413 History and Appreciation of the Artcrafts	
Natural Sciences	2 Lab-Based Courses from the Following: • AN 1344 Introduction to Biological Anthropology • BIO 1004 Anatomy and Physiology • BIO 1134 Biology I • BIO 1144 Biology II • BIO 3304 General Microbiology • CH 1213 Chemistry I • CH 1223 Chemistry II • GG 1113 Survey of Earth Sciences I + GG 1111 Lab • GG 1123 Survey of Earth Sciences II + GG 1121 Lab • PO 3103 / GNS 3103 / GNS 3103 Genetics I • GR 1114 Elements of Physical Geography • GR 1604 Weather and Climate • PH 1013 Physical Science Survey 1 + PH 1011 Lab • PH 1023 Physical Science Survey 2 + PH 1023 Lab • PH 1113 General Physics I • PH 1123 General Physics II • PH 1133 General Physics III • PH 2223 Physics II • PH 2233 Physics III • PSS 1313 Plant Science	6
Mathematics	• MA 1713 Calculus I (required)	3
Humanities	• PHI 1113 Intro to Logic (required)	3
Humanities	1 Course from the following: • AAS 1063 Introduction to African American Studies • AAS 2363 Introduction to African American Literature • AAS 3013 African American History to 1865 • AAS 3023 African American History since 1865 • ARC 2313 History of Architecture I • ARC 3313 History of Architecture II • ARC 3323 History of Architecture III • BCS 2013 Construction and Culture • EN 2203 Introduction to Literature • EN 2213 English Literature Before 1800 • EN 2223 English Literature After 1800 • EN 2243 American Literature Before 1865 • EN 2253 American Literature After 1865 • EN 2273 World Literature Before 1600 • EN 2283 World Literature After 1600 • FL 1113 Language I 1 • FL 1123 Language II 1 • FL 2133 Language III 1 • FL 2143 Language IV 1 • HI 1003 History of Science in Six Ideas • HI 1013 History of Technology in Six Objects • HI 1063 Early U.S. History • HI 1073 Modern U.S. History • HI 1163 World History Before 1500 • HI 1173 World History Since 1500	3

	• HI 1213 Early Western World • HI 1223 Modern Western World • HI 1313 East Asian Civilizations to 1300 • HI 1323 East Asian Civilizations since 1300 • HI 4683 Europe: The First World War to Hitler • HON 1163 The Quest Begins • HON 3183 Honors Seminar in the Humanities • PHI 1103 Introduction to Philosophy • PHI 1113 Introduction to Logic • PHI 3023 History of Western Philosophy I • PHI 3033 History of Western Philosophy II • PHI 3153 Aesthetics • REL 1103 Introduction to Religion • REL 3213 World Religions I • REL 3223 World Religions II	
Social / Behavioral Science	• DSCI 2013 Data Science Literacy (Required)	3
Social / Behavioral Science	1 Course from the Following: • ADS 1013 Animal Agriculture & Society: Food for Thought • AEC 2713 Introduction to Food and Resource Economics • AN 1103 Introduction to Anthropology • AN 1143 Introduction to Cultural Anthropology • AN 1543 Introduction to Archaeology • AN 2403 Introduction to the Study of Language • CO 1223 Introduction to Communication Theory • CO 1403 Introduction to the Mass Media • EC 1033 Economics of Social Issues • EC 2113 Principles of Macroeconomics • EC 2123 Principles of Microeconomics • EN 2403 Introduction to the Study of Language • EPY 2513 Human Growth and Development • EPY 3503 Principles of Educational Psychology • EPY 3543 Psychology of Adolescence • FO 4113 Forest Resource Economics • GR 1123 Introduction to World Geography • GR 2013 Human Geography • HON 1173 The West and the Wider World • HON 3143 Honors Seminar in Social Science • HDFS 1813 Individual and Family Development through the Lifespan • PO 1013 Animal Agriculture & Society: Food for Thought • PS 1113 American Government • PS 1313 Introduction to International Relations • PS 1513 Comparative Government • PSY 1013 General Psychology • PSY 3073 Psychology of Interpersonal Relations • SO 1003 Introduction to Sociology • SO 1103 Contemporary Social Problems • SO 1203 Sociology of Families	3
	Total	30

Note: general education requirements for oral communication and Junior / Senior writing are fulfilled via CO 3213 and CO 3223 (See Communications section below).

Data Science Core Coursework (63 Hours)

Mathematics and Statistics

The Mathematics and Statistics components of the degree will ensure the student has a firm grasp of mathematical concepts underlying the practice of data science, including matrices, calculus, discrete mathematics, statistics, and statistical inference. Depending upon the concentration, students may also take additional mathematics or statistics courses that will count toward the concentration requirements.

Course Code	Title	Hours
MA / ST 3123	Introduction to Statistical Inference Two hours laboratory. Basic concepts and methods of statistics, including descriptive statistics, probability, random variables, sampling distribution, estimation, hypothesis testing, introduction to analysis of variance, simple linear regression.	3
MA 1723	Calculus II Anti-differentiation; the definite integral; applications of the definite integral; integration of transcendental functions; other techniques of integration.	3
MA 2713	Calculus III Three hours lecture. Parametric and Polar Equations; infinite series; introduction to vectors; vector functions.	3
MA 3113	Introduction to Linear Algebra Linear transformations and matrices; eigen values and similarity transformations; linear functionals, bilinear and quadratic forms; orthogonal and unitary transformations; normal matrices; applications of linear algebra.	3
MA/ST 4523	Introduction to Probability Basic concepts of probability, conditional probability, independence, random variables, discrete and continuous probability distributions, moment generating function, moments, special distributions, central limit theorem.	3
	Total	15

Computer Science and Engineering

The Bachelor of Science in Data Science provides a student with a computer science sequence that covers these essential topics: techniques, skills, and tools necessary for computing practice; principles and practices for secure computing; and local and global impacts of computing solutions on individuals, organizations, and society. Depending upon the concentration, students may also take additional courses in Computer Science and Engineering that will count toward the concentration requirements.

Course Code	Title	Hours
CSE 1284	Introduction to Computer Programming Introductory problem solving and computer programming using object-oriented techniques. Theoretical and practical aspects of programming and problem solving.	4
CSE 1384	Intermediate Computer Programming Object-oriented problem solving, design, and programming. Introduction to data structures, algorithm design and complexity.	4
CSE 2813	Discrete Structures Concepts of algorithms, induction, recursion, proofs, topics from logic, set theory, combinatorics, graph theory fundamental to study of computer science.	3
CSE 2383	Data Structures and Analysis of Algorithms Non-linear data structures and their associated algorithms. Trees, graphs, hash tables, relational data model, file organization. Advanced software design and development.	3
CSE 4503	Database Management Systems Modern database models; basic database management concepts; query languages; database design through normalization; advanced database models; extensive development experience in a team environment.	3
CSE 4633	Artificial Intelligence Study of the computer in context with human thought processes. Heuristic programming; search programming; search strategies; knowledge representation; natural language understanding; perception; learning	3
CSE 3763	Legal and Ethical Issues in Computing Exploration of how and why information security laws and policies are developed and managed. Students learn about existing state and federal laws and explore social and ethical issues related to information technology and computing in society.	3
	Total	23

Business Information Systems

Data science professionals often create or use data from systems designed to manage case or business data. Depending upon the concentration, students may also take additional courses in Business or Management Information Systems courses that will count toward the concentration requirements.

Course Code	Title	Hours
BIS 3233	Management Information Systems A survey of the components, functions, and processes of Information Systems as they relate to managing modern organization for increased efficiency and competitiveness.	3
	Total	3

Communications

Data science students will learn to communicate clearly about data and will gain a mature understanding of scientific or logical methodology. Depending upon the concentration, students may also take additional courses in communication that will count toward the concentration requirements.

Course Code	Title	Hours
CO 3213	Small Group Communication Three hours lecture. A study of the problems and techniques of participation in and leadership of small groups.	3
CO 3223	Communication and Media Research Methods Three hours lecture. An introduction to methods used to study communication problems and processes.	3
	Total	6

Data Science Proper

Students will learn about data acquisition and the ethical and legal issues in data science. They will also, through labs, gain practical skills in applying data science concepts and using cloud and high-performance computing resources. Depending upon the concentration, students may also take additional courses in data science that will count toward the concentration requirements.

Course Code	Title	Hours
DSCI 3013	Fundamentals of Data Acquisition Exploration of various methods of data acquisition and management. Also includes topics in data privacy, governance, and stewardship.	3
DSCI 2012	Data Science Lab 1 - Data Wrangling Working with common data files and formats. Cleaning and formatting messy and complex data sets for easy access and analysis. Converting and mapping data from one raw form into another format to allow for more convenient consumption and organization of the data.	2
DSCI 3012	Data Science Lab 2 – Description, Analysis, and Inference Hands-on work with techniques such as regression analysis and other statistical inference techniques.	2
DSCI 3022	Data Science Lab 3 – Data Visualization Use of tools and programming libraries to visualize data using common approaches to the visual display of numerical information.	2
DSCI 3032	Data Science Lab 4 - Artificial Intelligence Use of Python with artificial intelligence and machine-learning libraries to train models in areas such as natural language processing, computer vision, and classification.	2
DSCI 2022	Data Science Lab 5 - Cloud, Quantum, and High-Performance Computing Exposure to cloud-based computing platforms that support use of GPU, TPU, Quantum, or other high-performance computing tasks for big data analysis tasks.	2
DSCI 4013	Data Visualization Course providing theoretical foundation for information visualization. Deals with external representation and interactive manipulation of information, data or artifacts using digital tools to enhance communication, analytical reasoning, and decision-making.	3
	Total	16

Areas of Concentration (30 Hours)

Each area of concentration combines fundamental, field-specific content, concentration electives designed to apply data science to the field, and a six-hour practicum/capstone project. On their third year, students will have the opportunity to select a concentration area from the several available areas offered by the different colleges on campus.

Visualization and Visual Analytics for Built Environment
College: College of Architecture, Art, and Design

The design and construction process for the built environment is rapidly transforming, driven by two primary forces. Architects and designers are increasingly adopting Building Information Modeling (BIM) techniques that allow more sustainable, accurate, and efficient design, planning, evaluation, and construction of the built environment. Rapid integration of IoT sensors and intelligent building systems that track every aspect of building performance complements the digital revolution in the design process. However, the data visualization and analytics efforts have significantly lagged behind data capture efforts by integrating IoT sensors in smart buildings. This gap presents an opportunity for a new class of professionals at the intersection of data science and design visualization. The industry needs new professionals who can bring together computational statistics and data analytic skills with visualization skills to inform the development of new workflows and strategies for the design and construction industries. Courses in this concentration train aim to fill this gap by preparing students in three complementary areas:

- Provide a foundation in basic principles of design and digital representation drawing from traditional art and design disciplines
- Develop advanced design visualization skills using state-of-the-art computer-aided design (CAD) and building information modeling (BIM) software tools used in the architecture, engineering, and construction industries
- Develop an understanding of advanced building systems and building performance simulations and evaluations

The fundamental discipline courses in this concentration thus introduce visualization and analytics techniques that support the entire building project lifecycle from design development, construction, and operation to increase efficiency and enhance performance. The two data science capstone projects for this concentration provide opportunities to engage in real-world problem-based learning by bringing together foundational data science skills with visualization and analytic skills developed as part of the concentration.

Category	Courses	Hours
Fundamental Discipline Courses	Complete EIGHT 3-credit courses out of the following TEN: • ART 1123 Design I (2D) • ART 2803 Intro to Comp. Art • ART 2813 Intermediate Computing for Design • ART 4813 Multimedia I • BCS 2313 Virtual Design & Construction • ID 3603 Digital Design for Interiors • ID 3363 3D CAD Modeling • ARC 2713 Passive Bldg. Systems • ARC 3723 Active Bldg. Systems • ARC 4633 Architecture and Virtual Spaces	24
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Computational Agriculture and Natural Resources
College: College of Agriculture and Life Sciences and the College of Forest Resources

The use of data science in the fields of agriculture and natural resources has increased substantially in recent years. The Computational Agriculture and Natural Resources (CANR) concentration trains students interested in data-driven careers in agriculture and natural resources through subject matter and applied data science coursework. Students who complete the CANR concentration will be equipped for careers as data scientists in agricultural production, agricultural technology, agricultural finance, natural resource management, wildlife and fisheries science, plant science, and other related fields.

Category	Courses	**Hours**
Fundamental Discipline Courses	Choose 1 Course from the Following: • AEC 2713 Introduction to Food and Resource Economics • ABE 1863 Engineering Technology in Agriculture • BCH 4013 Principles of Biochemistry	6

	• PSS 1313 Plant Science Choose 1 Course from the Following: • SBP 1103 Introduction to Sustainable Bioproducts • WFA 3133 Applied Ecology • FO 4123 Forest Ecology	
Core Concentration Courses	Choose 6 Credit Hours from the Following: CALS: • EC 2113 Principles of Macroeconomics • EC 3123 Intermediate Microeconomics • AEC 2223 Introduction to Sustainability Economics • AEC 3133 Introductory Agribusiness Management • AEC 3233 Introduction to Environmental Economics and Policy • AEC 4123 Financial and Commodity Futures Marketing • ABE 2173 Principles of Agricultural and Off-Road Machines • ABE 2543 Precision Agriculture I • ABE 4543 Precision Agriculture II • BCH 3102 Essential Biochemical Concepts and Analysis • BCH 4414 Protein Methods CFR: • SBP 2012 Intro to Bioproducts Industries • SBP 2123 Materials and Processing of Structure Bioproducts • WFA 4313 Fisheries Management • WFA 4613 Landscape Ecology • FO 2213 Forest Measurements • FO 2443 Essentials of Biotechnology • FO 4113 Forest Resource Economics • FO 4123 Forest Ecology	6
Applied Courses	Choose 12 Credit Hours from the Following: CALS: • AEC 4133 Analysis of Food Markets and Prices • AEC 4223 Applied Quantitative Analysis in Agricultural Economics • AEC 4363 Economics of Precision Agriculture • AEC 4413 Public Problems of Agriculture • AEC 4733 Econometric Analysis in Agricultural Economics • ABE 2873 Land Surveying • ABE 3513 The Global Positional System and Geographic Information Systems in Agriculture and Engineering • ABE 4163 Machine Management Agro-Ecosystems • ABE 4263 Soil and Water Management • ABE 4463 Introduction to Imaging in Biological Systems • ABE 4483 Introduction to Remote Sensing Technologies • BCH 4803 Integrative Protein Evolution • PSS 4483 Introduction to Remote Sensing Technologies CFR: • SBP 4013 Wood Anatomy • SBP 4253 Quantitative Methods in SBP • WFA 4123 Wildlife and Fisheries Biometrics • WFA 4243 Wildlife Techniques • WFA 4253 Application of Spatial Technologies to Wildlife Fisheries Management • FO 3015 Forest Description and Analysis • FO 4213 Forest Biometrics • FO 4313 Spatial Techniques in Natural Resources Management • FO 4453 Remote Sensing Applications • FO 4473 GIS for Natural Resource Management	12
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6

	Total	**30**

Business Information Systems
College: College of Business

Modern enterprise management presents complex challenges of identifying actionable knowledge derived from the emerging flood of new data captured by an exploding number of online processes and connected sensors and devices. Companies are redesigning their organizational structures and processes to leverage this new capability – the concentration in BIS will prepare students to play a leading role in this emerging digital transformation and help companies compete in the increasingly connected environment. Students will combine their in-depth understanding of business processes with the ability to apply data science techniques to analyze business data, enabling them to aid strategic decision making. The concentration in BIS prepares students to solve business problems and identify business opportunities in the context of intelligent data analytics and digital transformation. Students will master these skills through learning exercises and real-world projects, engaging in projects to develop and implement a data-driven decision process or solution based on data mining, artificial intelligence, machine learning, and knowledge discovery of hidden relationships that can be exploited for new advances in business strategy. This experiential learning approach enables students to leverage their skillsets in a contextualized environment, complete with project management requirements, cost-benefit trade-offs, implementation obstacles (including financial, political, administrative, temporal, and legal barriers), team building and culture-building requirements, progress measurement methods, and complete life-cycle management of data science projects.

Category	Courses	Hours
Fundamental Discipline Courses	Students will choose three courses from the following: • BL 2413 Legal Environment of Business • ACC 2013 Financial Accounting • ACC 2023 Managerial Accounting • EC 2113 Macro Economics • EC 2123 Macro Economics • FIN 3123 Financial Management • MGT 3113 Principles of Management • MKT 3013 Principles of Marketing • MKT 3323 International Logistics	9
Core Concentration Courses	• BQA 4423 Business Decision Analysis • BIS 4533 Decision Support Systems • BIS 4113 BIS Security Management • BIS 4753 Structured Systems Analysis and Design In addition, students will choose an elective from one 4000-level business course.	15
Capstone	Students will Register for the Following: • BIS 4763 BIS Senior Seminar (analytics project) • BQA 4413 Business Forecasting & Predictive Analytics	6
	Total	30

Marketing and Supply Chain Analytics
Colleges: College of Business

Marketing and supply chain functions are increasingly driven by data. Tasks such as analyzing online social media content, planning advertising campaigns across multiple online channels, designing cutting edge products, and delivering products through complex global supply chains, all require cutting edge data analytics skills.
The concentration in Marketing and Supply Chain Analytics prepares students to solve data-driven business problems relating to marketing and supply chain management. Fundamental discipline courses expose students to important principles in business. Core concentration courses include upper-level courses focused on marketing and supply-chain analytics. There is a strong focus on practical project-driven learning in this concentration, with several classes offering the chance to working on projects for local companies and non-profit organizations.

Category	Courses	Hours
Fundamental Discipline Courses	Students will take the following 2 Courses: • MKT 3013 Principles of Marketing • MKT 3323 International Logistics Students will choose two courses from the following:	12

	• BL 2413 Legal Environment of Business • ACC 2013 Financial Accounting • ACC 2023 Managerial Accounting • EC 2113 Macro Economics • EC 2123 Macro Economics • FIN 3123 Financial Management • MGT 3113 Principles of Management	
Core Concentration Courses	Students will choose four courses from the following list. • BQA 4423 Business Decision Analysis • BIS 4533 Decision Support Systems • MKT 4533 Marketing Research • MKT 4213 Internet Marketing • MKT 4033 International Transportation • MKT 4013 Procurement • MKT 4313 Physical Distribution Management	12
Capstone	Students will Register for the Following: • MKT 4333 International Supply Chain Management • BQA 4413 Business Forecasting & Predictive Analytics	6
	Total	30

Social Data Analytics
College: College of Arts and Sciences

Social Data Analytics prepares students to apply data science to understand sociological and political aspects of social media communication. Fundamental discipline courses lay discipline-specific foundations in social science. Core concentration courses prepare students for more advanced work with social media sources.

Category	Courses	Hours
Fundamental Discipline Courses	From the following courses, choose 9 hours, but no more than 6 hours in any one field: • AN 1103 Intro to Anthropology • AN 1143 Intro to Cultural Anthropology • AN 1344 Intro to Bio Anthropology • CO 1403 Intro to Mass Media • GR 2313 Maps and Remote Sensing • PS 1313 Intro to International Relations • PS 1513 Comparative Government • PS 2703 Intro to Public Policy • CRM 1003 Crime and Justice in America • SO 1003 Intro to Sociology • SO 1103 Contemporary Social Problems	9
Core Concentration Courses	Choose 15 hours from the following 3-hour courses: • AN 3343 Intro to Forensic Anthropology • AN 4173 Environment and Society • AN 4163 Anthropology of International Development • AN 4323 Plagues and People • CO 4213 Political Communication • CO 4283 Health Communication • CRM 4253 White Collar and Computer Crime • GR 3303 Survey of Geospatial Technologies • GR 4123 Urban Geography • PS 4243 State Election Policy and Politics • PS 4283 Public Opinion • PS 4293 Political Behavior • PS 4343 International Conflict and Security • PS 4373 International Terrorism • PS 4464 Political Analysis • PS 4523 Democracy and Inequality • PS 4613 Civil Wars and Intra-State Conflict • SO 3303 Rural Sociology	15

	• SO 4113 Social Organization and Change • SO 4123 Poverty, Analysis: People, Organization, and Program • SO 4173 Environment and Society	
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Psycho-informatics
College: College of Arts and Sciences

Psycho-informatics is subfield of phycology for the acquisition, organization, and synthesis of data collected from psychology to reveal information about psychological traits such as personality and mood. Psychology has historically relied on experiments and questionnaires to collect data. These methods face several disadvantages such as small number of participants and bias and unreliable memory. Psycho-informatics solves these problems by storing Big Data related to psychology (such as communications on smartphones or social media websites) and then data mining for relevant psychological information. This concentration prepares students to apply data science to the field of psychology. Fundamental discipline courses lay discipline-specific foundations in psychology. Core concentration courses prepare students for more advanced work with cognitive science and psychology. Students in the Psychology concentration are recommended to take PSY 1013 as their second required social science general education course.

Category	Courses	Hours
Fundamental Discipline Courses	• PSY 1021 Careers in Psychology • PSY 3104 Introductory Psychological Stats • PSY 3314 Experimental Psychology	9
Core Concentration Courses	Choose 9 hours from the following 3-hour courses: • PSY 3343 Psychology of Learning • PSY 3623 Social Psychology • PSY 3713 Cognitive Psychology • PSY 3803 Intro to Developmental Psych • PSY 4403 Biological Psychology Choose 6 hours from among any of the 4000 level Psychology courses.	15
Capstone	• PSY 4000 Directed Individual Study in Psychology • Students must perform research in a laboratory and present their capstone project at the Undergraduate Research Symposium.	6
	Total	30

Statistical Modeling
College: College of Arts and Sciences

The Statistical Modeling concentration prepares students to apply advanced statistical methods to build analytical and statistical models. Core concentration courses prepare students for more advanced work in statistics. The concentration focuses on statistical models and methods that are needed to discover and validate patterns in Big Data. It includes upper-levels statistics and mathematics courses and a two-semester practicum to apply the theoretical machinery of quantitative methods to the solution of real-world problems involving Big-Data.

Category	Courses	Hours
Core Concentration Courses	Complete 24 hours from the following 3-hour courses: • MA 2923 Intro. to Modern Scientific Computing • MA 4183 Math. Found. of Machine Learning • MA 4133 Discrete Mathematics • MA 4143 Graph Theory • ST 4213 Nonparametric • ST 4313 Intro to Spatial Statistics • ST 4543 Intro to Mathematical Statistics I • ST 4243 Data Analysis I	24
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science	6

	• DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	
	Total	30

Computational Intelligence
College: Bagley College of Engineering

Computational Intelligence focuses on understanding artificial intelligence and machine learning approaches to develop effective strategies to solve large-scale data science problems. This includes creation of new software tools, algorithms, and using existing programs and libraries. The concentration includes foundational courses in software development, algorithms, artificial intelligence, and machine learning. These ideas are then applied in various computer science-related contexts in upper-level courses and in a two-semester practicum.

Category	Courses	Hours
Core Concentration Courses	• CSE 2213 Methods & Tools in Software Development • CSE 4163 Designing Parallel Algorithms • CSE 4683 Machine Learning and Soft Computing • CSE 4833 Introduction to Algorithms • CSE 4643 AI Robotics • CSE 4623 Computational Biology • CSE 4653 Cognitive Science • CSE 4293 Artificial Intelligence for Cybersecurity	24
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

Geoinformatics
College: College of Arts and Sciences

The Geoinformatics concentration includes courses in three categories within the Department of Geosciences, comprising a total of 30 hours, with a focus on geospatial data acquisition and analysis. This includes nine hours of required coursework related to: (1) statistical analysis of geospatial data, (2) analysis and visualization of spatial data using Geographic Information Systems (GIS), and (3) acquisition of spatial information from remote sensing platforms. A further 15 hours will consist of courses in meteorology/climatology, geospatial science, and/or geology, with specific courses chosen based on student interest. These courses serve as the basis for attaining core knowledge on the nature and processes related to geoscience data, which is critical for applying data science skills in an appropriate and representative way with respect to geospatial information. The courses also act to showcase the specific applications of data science within the geoscience community, which will help students define future research strategies and interests as well as prepare them for careers as data scientists and geoinformatics professionals. The final six-hour capstone course will provide a means to apply general and discipline-specific data science skills by working directly with one or more geoscience research faculty. The course will involve designing and completing a research-based project that requires acquiring, analyzing, and interpreting geospatial information using sound scientific principles and critical thinking. By completing the Geoinformatics concentration within the Data Science BS, students will learn not only the skills and techniques required to be successful data scientists within the geospatial community, but also the knowledge necessary to make critical and relevant decisions within the scientific fields that rely on the collection and interpretation of spatial information.

Category	Courses	Hours

Fundamental Discipline Courses	Required courses (9 hours)
	• GR 4303 Principles of GIS[2]
	• Choose one of the following:
	  ○ GR 4333 Remote Sensing of the Physical Environment[2]
	  ○ GR 4783 Satellite Meteorology
	  ○ GR 4883 Radar Meteorology
	• GR 4633 Statistical Climatology
		9

Core Concentration Courses	Elective courses (15 hours – choose 5 from the following) • GR 4733 Synoptic Meteorology • GR 4643 Physical Meteorology and Climatology I • GR 4693 Physical Meteorology and Climatology II • GR 4613 Applied Climatology • GR 4783 Satellite Meteorology[1] • GR 4883 Radar Meteorology[1]	15

	• GR 4553 Computer Methods in Meteorology • GR 4313 Advanced GIS[2] • GR 4323 Cartographic Sciences[2] • GR 4333 Remote Sensing of the Physical Environment[1,2] • GR 4343 Advanced Remote Sensing[2] • GR 4363 GIS Programming[2] • GR 4123 Urban Geography • GG 3613 Water Resources • GG 4233 Applied Geophysics • GG 4413 Structural Geology • GG 4503 Geomorphology • GG 4523 Coastal Environments • GG 4543 Community Engagement in Geosciences • GG 4613 Physical Hydrogeology [1] Can be used as remaining hours if not already used for the required concentration [2] Counts towards the Geospatial and Remote Sensing Minor	
Capstone	Students will Register for the Following: • DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science • DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	6
	Total	30

6 Describe the faculty who will deliver this degree program including the members' names, ranks, disciplines, current workloads, and specific courses they will teach within the program. If it will be necessary to add faculty to begin the program, give the desired qualifications of the persons to be added.

All the faculty necessary to teach the program courses are already present at MSU. Most of the courses and other instructional activities necessary to fulfill the coursework requirements are already available in the MSU course catalog. To be sure, Mississippi State has an ongoing, strong focus on data science. More than 350 faculty and research scientists in a recent survey conducted by the Office of the Provost reported active involvement in data science research, teaching, and service and rated their expertise as either experts in data science theoretical frameworks, methods, and tools or as users of data science methods and tools. These faculty and research scientists are expected to provide the foundational intellectual capacity for the successful delivery of the program, especially in the concentration areas. Below find lists of faculty that will be involved in the teaching of the coursework for this program.

Program Core: General Education

Course Number	Course Name	Instructor	Rank
PHI 1113	Introduction to Logic	Dr. Alicia Hall	Associate Professor
PHI 1113	Introduction to Logic	Dr. Lynn Holt	Professor
PHI 1113	Introduction to Logic	Dr. Gregory Johnson	Instructor

Program Core: Mathematics and Statistics

Course Number	Course Name	Instructor	Rank
MA 1713	Calculus I	Dr. Robert Banik	Instructor
MA 1723	Calculus II	Dr. Robert Banik	Instructor
MA 2733	Calculus III	Dr. Robert Banik	Instructor
MA 1713	Calculus I	Dr. Snehalatha Ballamoole	Assistant Clinical Professor
MA 2733	Calculus III	Dr. Snehalatha Ballamoole	Assistant Clinical Professor
MA 3113	Introduction to Linear Algebra	Dr. Snehalatha Ballamoole	Assistant Clinical Professor
MA 1713	Calculus I	Dr. Jennifer Beckman	Instructor
MA 1723	Calculus II	Dr. Jennifer Beckman	Instructor
MA/ST 3123	Introduction to Statistical Inference	Dr. Jennifer Beckman	Instructor
MA 1713	Calculus I	Dr. Velinda Calvert	Assistant Clinical Professor
MA 1723	Calculus II	Dr. Velinda Calvert	Assistant Clinical Professor
MA 3113	Introduction to Linear Algebra	Dr. Velinda Calvert	Assistant Clinical Professor
MA 1713	Calculus I	Dr. Abigail Good	Instructor
MA 1723	Calculus II	Dr. Abigail Good	Instructor
MA 2733	Calculus III	Dr. Abigail Good	Instructor
MA 1713	Calculus I	Dr. Julie Nation	Instructor
MA 1723	Calculus II	Dr. Julie Nation	Instructor
MA 2733	Calculus III	Dr. Julie Nation	Instructor

MA 1713	Calculus I	Dr. Amber Robinson	Instructor
MA 1723	Calculus II	Dr. Amber Robinson	Instructor
MA 2733	Calculus III	Dr. Amber Robinson	Instructor
MA 1713	Calculus I	Dr. Jaclyn Smith	Instructor
MA 1723	Calculus II	Dr. Jaclyn Smith	Instructor
MA 2733	Calculus III	Dr. Jaclyn Smith	Instructor
MA 1713	Calculus I	Dr. Jacob Tschume	Instructor
MA 1723	Calculus II	Dr. Jacob Tschume	Instructor
MA 3113	Introduction to Linear Algebra	Dr. Jacob Tschume	Instructor
MA 1713	Calculus I	Dr. Kim Walters	Instructor
MA 1723	Calculus II	Dr. Kim Walters	Instructor
MA 2733	Calculus III	Dr. Kim Walters	Instructor
MA 1713	Calculus I	Dr. Danielle Young	Instructor
MA 1723	Calculus II	Dr. Danielle Young	Instructor
MA 2733	Calculus III	Dr. Danielle Young	Instructor

Program Core: Computer Science

Course Number	Course Name	Instructor	Rank
CSE 1284	Introduction to Computer Programming	Mr. Joshua Crowson	Instructor
CSE 1384	Intermediate Computer Programming	Ms. Kortni Neal	Instructor
CSE 2813	Discrete Structures	Dr. Andy Perkins	Professor
CSE 2383	Data Structures and Analysis of Algorithms	Mr. Aubrey Knight	Instructor
CSE 3763	Legal and Ethical Issues in Computing	Dr. David Lee, J.D.	Lecturer
CSE 4503	Database Management Systems	Coordinator: Dr. Andy Perkins	Professor
CSE 4633	Artificial Intelligence	Dr. Eric Hansen	Associate Professor

Program Core: Communications

Course Number	Course Name	Instructor	Rank
CO 3213	Small Group Communication	Dr. Amy Knight	Instructor
CO 3223	Communication and Media Research Methods	Dr. Holli Seitz	Assistant Professor
CO 3213	Small Group Communication	Dr. John Nicholson	Associate Professor

Program Core: Data Science Proper

Course Number	Course Name	Instructor	Rank
DSCI 3013	Fundamentals of Data Acquisition	Dr. Mimmo Parisi	Professor
DSCI 3013	Fundamentals of Data Acquisition	Dr. Jonathan Barlow	Instructor
DSCI 2012	Data Science Lab 1 – Data Wrangling	Dr. Mimmo Parisi	Professor
DSCI 2012	Data Science Lab 1 – Data Wrangling	Dr. Jonathan Barlow	Instructor
DSCI 3012	Data Science Lab 2 – Description, Analysis, and Inference	Dr. Mimmo Parisi	Professor
DSCI 3012	Data Science Lab 2 – Description, Analysis, and Inference	Dr. Jonathan Barlow	Instructor
DSCI 3022	Data Science Lab 3 – Data Visualization	Dr. Mimmo Parisi	Professor
DSCI 3022	Data Science Lab 3 – Data Visualization	Dr. Jonathan Barlow	Instructor
DSCI 3032	Data Science Lab 4 – Artificial Intelligence	Dr. Mimmo Parisi	Professor
DSCI 3032	Data Science Lab 4 – Artificial Intelligence	Dr. Jonathan Barlow	Instructor
DSCI 2022	Data Science Lab 5 – Cloud, Quantum, and High-Performance Computing	Dr. Mimmo Parisi	Professor

DSCI 2022	Data Science Lab 5 – Cloud, Quantum, and High-Performance Computing	Dr. Jonathan Barlow	Instructor
DSCI 4013	Data Visualization	Dr. Bimal Balakrishnan	Professor
DSCI 4553	Capstone Project 1	Faculty per Concentration	
DSCI 4663	Capstone Project 2	Faculty per Concentration	

Program Core: Business Information Systems

Course Number	Course Name	Instructor	Rank
BIS 3233	Management Information Systems	Dr. Merrill Warkentin	Professor
BIS 3233	Management Information Systems	Dr. Kent Marett	Associate Professor
BIS 3233	Management Information Systems	Dr. Alaa Nehme	Assistant Professor
BIS 3753	Business Database Systems	Dr. David Sikolia	Assistant Clinical Professor
BIS 3753	Business Database Systems	Dr. Martin Kang	Assistant Professor
BIS 3753	Business Database Systems	Dr. Merrill Warkentin	Professor

Program Concentration: Visualization and Visual Analytics for Built Environment:

Course Number	Course Name	Instructor	Rank
ART 1123	Design I (2D)	Dr. Katherine Voorhies	Lecturer
ART 1123	Design I (2D)	Dr. Rowan Haug	Instructor
ART 2803	Introduction to Comp. Art	Dr. Katherine Voorhies	Lecturer
ART 2813	Intermediate Computing for Design	Dr. Jeralyn Powney	Associate Professor
ART 4813	Multimedia I	Dr. Keum Taek Jung	Assistant Professor
BCS 2313	Virtual Design and Construction	TBD	
ID 3603	Digital Design for Interiors	Dr. Lyndsey Miller	Associate Professor
ID 3363	3D CAD Modeling	Dr. Lyndsey Miller	Associate Professor
ARC 2713	Passive Building Systems	Dr. Duane McLemore	Assistant Professor
ARC 3723	Active Building Systems	Dr. John Ross	Assistant Professor
ARC 4633	Architecture and Virtual Spaces	Dr. Duane McLemore	Assistant Professor

Program Concentration: Computational Agriculture and Natural Resources:

Course Number	Course Name	Instructor	Rank
EC 2113	Principles of Macroeconomics	Dr. Heriberto Gonzalez	Assistant Clinical Professor of Economics
EC 3123	Intermediate Microeconomics	Dr. Sandra Orozco-Aleman	Associate Professor of Economics
EC 3123	Intermediate Microeconomics	Dr. Todd Jones	Assistant Professor of Economics
AEC 2713	Introduction to Food and Resource Economics	Dr. Matthew Janzen	Instructor
AEC 2713	Introduction to Food and Resource Economics	Dr. Will Davis	Assistant Professor
AEC 2223	Introduction to Sustainability Economics	Dr. Seong Do Yun	Assistant Professor
AEC 3133	Introduction to Agribusiness Management	Dr. McKenzie Maples	Instructor
AEC 3233	Introduction to Environmental Economics and Policy	Dr. Matthew Interis	Professor
AEC 4123	Financial and Commodity Futures Marketing	Dr. William Maples	Assistant Professor
AEC 4133	Analysis of Food Markets and Prices	Dr. Kayln Coatney	Associate Professor
AEC 4223	Applied Quantitative Analysis in Agricultural Economics	Dr. Elizabeth Canales	Assistant Professor
AEC 4363	Economics of Precision Agriculture	Dr. Xiaofei Li	Assistant Professor
AEC 4413	Public Problems of Agriculture	Dr. Joshua Maples	Assistant Professor
AEC 4733	Econometric Analysis in Agricultural Economics	Dr. Ardian Harri	Professor
BCH 4414	Protein Methods	Dr. Natraj Krishnan	Associate Professor

BCH 4414	Protein Methods	Dr. Xueyan Shan	Associate Research Professor
BCH 3102	Essential Biochemical Concepts and Analysis	Dr. Florencia Meyer	Associate Professor
BCH 4803	Introduction to Remote Sensing Technologies	Dr. Federico Hoffmann	Associate Professor
PSS 4483	Introduction to Remote Sensing Technologies	Dr. Vitor Martins	Assistant Professor
PSS 4543	Precision Agriculture II	Dr. Amelia Fox	Assistant Clinical Professor
PSS 2543	Precision Agriculture I	Dr. Timothy Bradford Jr	Instructor
ABE 2173	Principles of Agricultural and Off-Road Machines	Dr. Nuwan Wijewardane	Assistant Professor
ABE 4163	Machine Management Agro-Ecosystems	Dr. Nuwan Wijewardane	Assistant Professor
ABE 2873	Land Surveying (Spring)	Dr. John Wes Lowe	Assistant Professor
ABE 2873	Land Surveying (Fall)	Dr. Joel Paz	Professor
ABE 4263	Soil and Water Management	Dr. Joel Paz	Professor
ABE 3513	The Global Positional System and Geographic Information Systems in Agriculture and Engineering	Dr. Xin Zhang	Assistant Professor
ABE 4463	Introduction to Imaging in Biological Systems	Dr. Yuzhen Lu	Assistant Professor
ABE 4483	Introduction to Remote Sensing Technologies	Dr. Vitor Martins	Assistant Professor
ABE 1863	Engineering Technology in Agriculture	Dr. Prem Parajuli	Professor
ABE 1863	Engineering Technology in Agriculture	Dr. Chad Winter	ABE Advisory Board Member
WFA 3133	Applied Ecology	Dr. Sandra B. Correa	Assistant Professor
WFA 4113	Animal Behavior	Dr. Kristine O. Evans	Assistant Professor
WFA 4243	Wildlife Techniques	Dr. Dana Morin	Assistant Professor
WFA 4123	Wildlife and Fisheries Biometrics	Dr. Garrett Street	Associate Professor
WFA 4253	Application of Spatial Technologies to Wildlife and Fisheries Management	Dr. Eric Hileman	Assistant Research Professor
FO 4113	Forest Resource Economics	Dr. Robert Grala	Professor
FO 2213	Forest Measurements	Dr. Joshua Granger	Assistant Professor
FO 4123	Forest Ecology	Dr. Austin Himes	Assistant Professor
FO 4213	Forest Biometrics	Dr. Krishna Poudel	Assistant Professor
FO 4313	Spatial Techniques in Natural Resources Management	Dr. Jia Yang	Assistant Professor
FO 4453	Remote Sensing Applications	Dr. Jia Yang	Assistant Professor
FO 4473	GIS for Natural Resource Management	Dr. Jia Yang	Assistant Professor
SBP 1103	Introduction to Sustainable Bioproducts	Dr. Tamara Franca	Assistant Professor
SBP 2012	Introduction to Bioproducts Industries	Dr. Jason Street	Associate Professor
SBP 2123	Materials and Processing of Structural Bioproducts	Dr. Frederico Franca	Assistant Research Professor
SBP 4013	Wood Anatomy	Dr. Frank Owens IV	Assistant Professor
SBP 4253	Quantitative Methods in Sustainable Bioproducts	Dr. Roy Seale	Professor
ADS 1113	Animal Science (Fundamental Course)	Dr. Jamie Larson	Professor
ADS 1113	Animal Science (Fundamental Course)	Dr. Marcus McGee	Assistant Clinical Professor
ADS 3013	Anatomy and Physiology	Dr. Caleb Lemley	Associate Professor
ADS 3313	Introduction to Meat Science	Dr. Thu Dinh	Associate Professor
ADS 4523	Internet Based Management in Livestock Industries	Dr. Jane Parish	Professor
ADS 4523	Internet Based Management in Livestock Industries	Dr. Kelsey Harvey	Professor

Program Concentration: Business Information Systems:

Course Number	Course Name	Instructor	Rank
BIS 4113	BIS Security Management	Dr. Kent Marett	Associate Professor
BIS 4113	BIS Security Management	Dr. Merrill Warkentin	Professor
BIS 4113	BIS Security Management	Dr. Alaa Nehme	Assistant Professor
BIS 4533	Decision Support Systems	Dr. Robert Otondo	Professor
BIS 4533	Decision Support Systems	Dr. Alaa Nehme	Assistant Professor
BIS 4533	Decision Support Systems	Dr. Merrill Warkentin	Professor
BIS 4533	Decision Support Systems	Dr. Martin Kang	Assistant Professor
BIS 4753	Structured Systems Analysis and Design	Dr. Merrill Warkentin	Professor
BIS 4753	Structured Systems Analysis and Design	Dr. David Sikolia	Assistant Clinical Professor
BIS 4763	Senior Seminar	Dr. Alaa Nehme	Assistant Professor
BIS 4763	Senior Seminar	Dr. Martin Kang	Assistant Professor
BIS 4763	Senior Seminar	Dr. Merrill Warkentin	Professor

Program Concentration: Marketing and Supply Chain Analysis:

Course Number	Course Name	Instructor	Rank
MKT 3013	Principles of Marketing	Dr. Melissa Moore	Professor, Department Chair
MKT 3323	International Logistics	Dr. Frank Adams	Associate Professor
BQA 4423	Business Decision Analysis	Dr. Yueran Zhuo	Assistant Professor
BIS 4533	Decision Support Systems	IS Faculty Member	
MKT 4533	Marketing Research	Dr. Bingyang Hu	Assistant Professor
MKT 4213	Internet Marketing	Dr. Robert Moore	Professor
MKT 4033	International Transportation	Dr. Christopher Boone	Assistant Professor
MKT 4013	Procurement	Dr. Frank Adams	Associate Professor
MKT 4313	Physical Distribution Management	Dr. Jason Lueg	Professor
MKT 4333	International Supply Chain Management	Dr. Lu He	Instructor
BQA 4413	Business Forecasting & Predictive Analytics	Dr. Stephen France	Associate Professor

Program Concentration: Social Data Analytics:

Course Number	Course Name	Instructor	Rank
AN Courses		Dr. Shane Miller	Associate Professor
AN Courses		Dr. Jordan Lynton	Assistant Professor
PS Courses		Dr. Brian Shoup	Associate Professor
PS Courses		Dr. Ben Tkach	Assistant Professor
CRM Courses		Dr. Dave May	Professor
SO Courses		Dr. Margaret Ralston	Associate Professor
CO Courses		Dr. Holli Seitz	Assistant Professor
GR Courses		Dr. Qingmin Meng	Associate Professor

Program Concentration: Psycho-informatics:

Course Number	Course Name	Instructor	Rank
PSY 1021	Careers in Psychology	Dr. Rebecca Armstrong	Instructor
PSY 3803	Introduction to Developmental Psychology	Dr. Rebecca Armstrong	Instructor
PSY 3104	Introductory Psychological Stats	Dr. Bennett Porter	Associate Professor
PSY 3314	Experimental Psychology	Dr. Clifford McKinney	Professor
PSY 3623	Social Psychology	Dr. Hillary Sinclair	Associate Professor
PSY 3623	Social Psychology	Dr. Carolyn Adams-Price	Associate Professor
PSY 3713	Cognitive Psychology	Dr. Julia Soares	Assistant Professor
PSY 3713	Cognitive Psychology	Dr. Andrew Jarosz	Associate Professor
PSY 3343	Psychology of Learning	Dr. Andrew Jarosz	Associate Professor
PSY 4403	Biological Psychology	Dr. Kimberly Brown	Lecturer

Program Concentration: Statistical Modeling:

Course Number	Course Name	Instructor	Rank
MA 2923	Introduction to Modern Sci. Comp.	Dr. Amanda Diegel	Assistant Professor
MA 4183	Math. Found. Of Machine Learning	Dr. Amanda Diegel	Assistant Professor
MA/ST 4523	Introduction to Probability	Dr. Jan DuBien	Associate Professor
MA 2923	Introduction to Modern Sci. Comp.	Dr. Seongjai Kim	Professor
MA 4183	Math. Found. Of Machine Learning	Dr. Seongjai Kim	Professor
ST 4313	Introduction to Spatial Statistics	Dr. Vu Thai Luan	Assistant Professor
MA 2923	Introduction to Modern Sci. Comp.	Dr. Vu Thai Luan	Assistant Professor
MA 4183	Math. Found. Of Machine Learning	Dr. Vu Thai Luan	Assistant Professor
MA/ST 3123	Introduction to Statistical Inference	Dr. Xinyuan Chen	Assistant Professor
MA/ST 4523	Introduction to Probability	Dr. Xinyuan Chen	Assistant Professor
ST 4313	Introduction to Spatial Statistics	Dr. Xinyuan Chen	Assistant Professor
ST 4543	Introduction to Math Stats. I	Dr. Prakash Patil	Professor
ST 4243	Data Analysis	Dr. Jingyi Shi	Assistant Professor
ST/MA 2923	Introduction to Modern Sci. Comp.	Dr. Jingyi Shi	Assistant Professor
MA 4143	Graph Theory	Dr. Vaidyanathan Sivaraman	Assistant Professor
MA 4133	Discrete Mathematics	Dr. Vaidyanathan Sivaraman	Assistant Professor
ST 4313	Introduction to Spatial Statistics	Dr. Jon Woody	Associate Professor
ST 4243	Data Analysis	Dr. Jon Woody	Associate Professor
ST 4213	Nonparametric	Dr. Tung-Lung Wu	Associate Professor
ST 4543	Introduction to Math Stats. I	Dr. Tung-Lung Wu	Associate Professor
MA/ST 4523	Introduction to Probability	Dr. Tung-Lung Wu	Associate Professor
ST 4213	Nonparametric	Dr. Shantia Yarahmadian	Associate Professor
MA 2923	Introduction to Modern Sci. Comp.	Dr. Shantia Yarahmadian	Associate Professor
MA 4183	Math. Found. Of Machine Learning	Dr. Shantia Yarahmadian	Associate Professor
ST 4213	Nonparametric	Dr. Jialin Zhang	Assistant Professor
ST 4243	Data Analysis	Dr. Jialin Zhang	Assistant Professor
ST 4213	Nonparametric	Dr. Qian Zhou	Assistant Professor
ST 4243	Data Analysis	Dr. Qian Zhou	Assistant Professor

Program Concentration: Computational Intelligence:

Course Number	Course Name	Instructor	Rank
CSE 2213	Methods & Tools in Software Development	Ms. Kortni Neal	Instructor
CSE 4163	Designing Parallel Algorithms	Dr. Ed Luke	Professor
CSE 4683	Machine Learning and Soft Computing	Dr. Shahram Rahimi	Professor
CSE 4833	Introduction to Algorithms	Dr. Maxwell Young	Assistant Professor
CSE 4643	AI Robotics	Dr. Jingdao Chen	Assistant Professor
CSE 4623	Computational Biology	Dr. Andy Perkins	Professor
CSE 4653	Cognitive Science	Coordinator: Dr. Shahram Rahimi	Professor
CSE 4293	AI for Cybersecurity	Dr. Sudip Mittal	Assistant Professor

Program Concentration: Geoinformatics:

Course Number	Course Name	Instructor	Rank
GR 4303	Principles of GIS	Dr. Shrinidhi Ambinakudige	Professor
GR 4333	Remote Sensing of the Physical Environment	Dr. Padmanava Dash	Associate Professor
GR 4783	Satellite Meteorology	Dr. Kim Wood	Assistant Professor

GR 4883	Radar Meteorology	Dr. Mike Brown	Professor
GR 4633	Statistical Climatology	Dr. Andrew Mercer	Professor
GR 4733	Synoptic Meteorology	Dr. Andrew Mercer	Professor
GR 4643	Phys Met and Clim I	Dr. Kim Wood	Assistant Professor
GR 4693	Phys Met and Clim II	Dr. Chris Fuhrmann	Associate Professor
GR 4613	Applied Climatology	Dr. Boniface Fosu	Assistant Professor
GR 4553	Comp Methods in Met	Dr. Erik Fraza	Assistant Professor
GR 4313	Advanced GIS	Dr. Qingmin Meng	Associate Professor
GR 4323	Cartographic Sciences	Dr. Qingmin Meng	Associate Professor
GR 4343	Adv. Remote Sensing	Dr. Padmanava Dash	Associate Professor
GR 4363	GIS Programming	Dr. Qingmin Meng	Associate Professor
GR 4123	Urban Geography	Dr. Brian Williams	Assistant Professor
GG 3613	Water Resources	Dr. Varun Paul	Assistant Professor
GG 4233	Applied Geophysics	Dr. Adam Skarke	Associate Professor
GG 4413	Structural Geology	Dr. Kelsey Warden	Assistant Professor
GG 4503	Geomorphology	Dr. Sarah Lalk	Assistant Professor
GG 4523	Coastal Environments	Dr. Adam Skarke	Associate Professor
GG 4543	Community Engaged Geosciences	Dr. Sarah Lalk	Assistant Professor
GG 4613	Physical Hydrogeology	Dr. Varun Paul	Assistant Professor

As the program evolves over the next five years, additional resources will be required to cover the new data science courses and other instructional activities and to cover new sections necessary to meet the growth of the number of students enrolled in the core program courses. Five new data science courses along with five data science labs have already been developed to ensure that the proposed program will meet all the learning objectives and outcomes expected for the accreditation of a Bachelor of Science in Data Science. Currently we have the faculty to teach these new courses and labs. But in the next five years, depending upon enrollment, new faculty lines will be required to support and maintain the growth of the program.

7 Describe the library holdings relevant to the proposed program, noting strengths and weaknesses. If there are guidelines for the discipline, do current holdings meet or exceed standards?

The Mississippi State library has adequate holding for the proposed programs, especially in the core program areas and the identified concentration areas. In the field of data science, students and faculty can generally rely on open-source resources that include software, data, and tutorials. They can also rely on open access journals and books. Additionally, MSU has access to additional resources through the SEC Library Consortium agreement. The Mississippi State library holds the following databases that are specifically relevant to the data science program. These databases host a variety of journals, conferences, and workshops:

- Academic Search Complete
- ACM Digital Library
- ASTM Digital Library

8 Describe the procedures for evaluation of the program and its effectiveness in the first five years of the program, including admission and retention rates, program outcome assessments, placement of graduates, changes in job market need/demand, ex-student/graduate surveys, or other procedures.

The program's success will be built on championing program evaluation as means to promote a culture of continued quality improvement as part of the overall effort to achieve the learning objectives set forth by the program effectively. This will create an environment where assessment and evaluation are embedded in the regular discourse surrounding quality improvement for curriculum and student experience. This will be accomplished by developing an evaluation plan that will provide key indicators to gauge student learning outcomes, quality of instruction, and quality of the overall strategy for the delivery of the program. Data for measuring student learning outcomes will come from assessments such as exams, quizzes, homework, and laboratory assignments. Data for measuring quality of instruction will come from student faculty evaluations and other metrics available for assessment of instruction. The overall quality of the programs will be assessed by looking at completion rates or the number of students who completed the program in 4, 5 and 6 years. It will also include placement rates or the number of students who find a job within 3 months, 6 months, and a year of graduation and an indicator that measures the extent to which jobs sought by students fits their educational background. Graduates will also be surveyed to learn about the strengths and weaknesses of the program and how the program is helping them in their professional careers. External reviewers will also be identified to conduct periodic self-studies, and when possible, to seek accreditation through the ABET Computing Accrediting Commission or other accreditation bodies relevant to establishing the overall quality of the program.

9 What is the specific basis for determining the number of graduates expected in the first five years?

In the Fall of 2021, MSU offered its first course in data science literacy. More than 90 students enrolled and 85 completed the course successfully. In Spring of 2022, the same course was offered in-person and online and there are approximately 130 students enrolled. Based on level of interest shown for this class over the last two semesters, enrollment at the launch of the Bachelor of Science in Data Science is expected to be a minimum of 50 students in Year 1, followed by 130 in Year 2, 210 in Year 3, 310 in year 4, and 410 by the end of Year 5. A key assumption is that the first-year cohort will include an appreciable number of students who might switch majors

(switchers) or transfer from another institution. From the second cohort on, the proportion of new students is expected to increase considerably. Another assumption is that composition of student population majoring in data science will reflect the university's overall composition with 60 percent of the students being Mississippi resident students and the remaining 40 percent non-resident students.

10 Using expected enrollment, provide the total anticipated budget for the program including implementation and 4 subsequent years (total of 5 years) of operation; any anticipated direct, indirect, and incremental costs necessary to start the program; anticipated, incremental annual revenue based on student enrollment; and other sources of funding.

Year	Incoming Students*	Total Enrollment	Start-Up Costs	A Additional Annual Costs	B Additional Annual Revenue	C Non-Tuition Revenue	A – (B+C) Differential
2022-2023	50	50	0	227,700	373,150	0	145,450
2023-2024	80	130	0	683,700	970,190	0	286,490
2024-2025	80	210	0	849,300	1,567,230	0	717,930
2025-2026	100	310	0	849,300	2,313,530	0	1,464,230
2026-2027	100	410	0	849,300	3,059,830	0	2,210,530
TOTAL	410	410		3,459,300	8,283,930	0	4,824,630

*Please note that the predicted number of incoming students has been on the conservative side, but we anticipate as the popularity of the degree program grows among students, that incoming student numbers may increase more rapidly.

Please explain what has been included in the costs and revenues.

For the first year, the initial cost will primarily include a full-time program coordinator and a half-time program advisor. The second year the cost will also include the hiring of four instructors and six teaching assistants. For the third year, depending upon enrollment, the plan is to hire four clinical professors and six teaching assistants. No startup costs are anticipated. The university will leverage existing resources for the setup of labs and GPUs.

The overall revenue estimates are based on several assumptions. The first assumption is that for the first year, most of the students will be switchers, but following the second year on, there will be primarily new students. The second assumption is that students in the data science major will reflect the university student's composition-- 60% in state and 40% out-of-state students. Another assumption is that the revenue estimates are going to be based on 50% of the tuition revenue fully dedicated for instruction. Based on these assumptions, we were able to calculate the expected revenue based on the numbers reported in the table above.

11. Program Demand: Select one or both of the following to address student demand:

A. Survey of Student Interest

Number of surveys administered. . . . . _____
Number of completed surveys returned. . . . . _____
Percentage of students interested in program. . . . _____

Include a brief statement that provides additional information to explain the survey.

B. Market Analysis or Evidence of Labor Market Need

[Please limit to approximately 500 words; place your Market Analysis or Evidence of Labor Market Need here.]

Data Science experts are currently among the most sought professionals in the labor market because they allow businesses and organizations to place data at the center of their solutions. Demand for data science experts is and has been increasing since AI and Big Data have come to dominate how the private and public sectors operate to meet the demand for goods and services effectively. According to LinkedIn, since 2012 the demand for data science experts has grown by 650%. According to the U.S. Bureau of Labor Statistics, the rise of demand for data science expertise will create roughly 11.5 million new jobs by 2026. The World Economic Forum indicates that data science experts will become the number one emerging role in the world. Harvard Business Review refers to data science occupations as the "sexiest jobs of the 21st century." A recent study conducted by LinkedIn reports that data science experts earn an average annual salary between $78,000 and $150,000.

12. Employment Opportunities for Graduates (state, region, nation):

Digital transformation is a global phenomenon creating the need for data science experts at local, regional, national, and international levels. Many businesses in Mississippi are going through the process of introducing AI and Big Data in their operations. The survival of many of these businesses will depend on their ability to find a qualified workforce to support, sustain, and expand the use of AI and Big Data in their operations. State government also is going through the same digital transformation. The shortage of data science experts in the southern region of the US threatens the economic completeness of the region. To address this challenge, the major research institutions in the Southeastern Conference (SEC) formed a consortium to leverage their educational resources toward increasing the production of undergraduates with data science and AI backgrounds. At the national level, congress is proposing an investment of over $100M to increase the competitiveness of the US economy. We have seen similar trends at the international level. As organizations and businesses in the state and around the world turn to data solutions and AI strategies, they are also increasingly creating new economic opportunities for our graduates. Because of these trends, the Bachelor of Science in Data Science is a key program to promote economic development in the state.

MISSISSIPPI STATE UNIVERSITY

Office of the Provost and Executive Vice President
P.O. Box BQ
3500 Lee Hall
Mississippi State, MS 39762

P. 662.325.3742
F. 662.325.4039

University Committee on Data Science
Office of the Provost
Mississippi State, MS 39762

February 24, 2022

Andy Perkins
University Committee on Courses and Curricula
PO Box 5268
Mississippi State, MS 39762

Dear Dr. Perkins:

The members of the University Committee on Data Science provide this letter to express support for the addition of the Bachelor of Science in Data Science. The proposed degree is a 123-hour Inter-College Program designed by the committee to include three general areas of coursework that draw on different disciplines available across our colleges on campus. The Office of the Provost and the Executive Vice President established the committee and charged it to provide oversight for the development of the curriculum of the new program. Committee membership includes two representatives from each college present on our campus.

The addition of this new degree program to our existing offerings will require the creation of 11 new undergraduate courses. Of those, 10 will be in the Office of the Provost and one in the Department of Computer Science. Specifically, under the Office of the Provost will be:

1. DSCI 2013 Data Science Literacy
2. DSCI 3013 Fundamentals of Data Acquisition
3. DSCI 4013 Data Visualization
4. DSCI 2012 Data Science Lab 1: Data Wrangling
5. DSCI 3012 Data Science Lab 2: Description, Analysis, and Inference
6. DSCI 3022 Data Science Lab 3: Data Visualization
7. DSCI 3032 Data Science Lab 4: Artificial Intelligence
8. DSCI 2022 Data Science Lab 5: Cloud, High-Performance, and Quantum Computing
9. DSCI 4553 Capstone Project 1 for Bachelor of Science in Data Science,
10. DSCI 4663 Capstone Project 2 for Bachelor of Science in Data Science

The department of computer science will add:

11. CSE 4293 Artificial Intelligence for Cybersecurity.

With the additional faculty resources included in the Appendix A application, the addition of these new classes should not place an undue burden on existing university faculty. The committee approved the application for the new degree program in addition to the new proposed courses on February 24th, with 22 faculty members present.

The new Bachelor of Science in Data Science degree program will add a valuable new dimension to the Mississippi State University's offerings. The new courses will be available not only for students in the new degree program, but also for students in other majors.

Sincerely,
The following undersigned members of the University Committee on Data Science.

Data Science University Committee Members

Dr. Mimmo Parisi
Senior Advisor for European and Data Science Dev
Office of the Provost and Executive Vice President

Dr. Peter Ryan
Executive Vice President
Office of the Provost and Executive Vice President

Dr. Andy Perkins
Associate Department Head
James Worth Bagley College of Engineering

Dr. Linkan Bian
Associate Professor
James Worth Bagley College of Engineering

Dr. Bimal Balakrishnan
Associate Dean
College of Architecture, Art, and Design

Dr. Duane McLemore
Assistant Professor
College of Architecture, Art, and Design

Dr. Mohsen Razzaghi
Department Head
College of Arts and Sciences

Dr. Melanie Loehwing
Interim Associate Dean
College of Arts and Sciences

Dr. Will Davis
Assistant Professor
College of Agriculture and Life Sciences

Dr. Xin Zhang
Assistant Professor
College of Agriculture and Life Sciences

Dr. Merrill Warkentin
Professor
College of Business

Dr. Stephen France
Associate Professor
College of Business

Dr. Dan Gadke
Interim Associate Dean
College of Education

Dr. Kim Hall
Interim Associate Dean of Academics
College of Education

Dr. Rubin Shmulsky
Department Head
College of Forest Resources

Dr. Guiming Wang
Professor
College of Forest Resources

Dr. David Smith
Associate Dean
College of Veterinary Medicine

Dr. Bindu Nanduri
Professor
College of Veterinary Medicine

Mr. Stephen Cunetto
Associate Dean
University Libraries

Ms. Mary Ann Jones
Associate Professor
University Libraries

Dr. Jonathan Barlow
Instructor
Office of the Provost and Executive Vice President

Dr. Jamie Dyer
Assistant Vice President Intern
Office of the Provost and Executive Vice President

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF EDUCATION
Office of the Dean

Box 9710
Mississippi State, MS 39762

(662) 325-3717
Fax: (662) 325-8784

March 8, 2022

Dear Dr. Perkins and Members of the University Committee on Courses and Curricula:

I am writing to express support for the proposed Bachelor of Science in Data Science degree program. Although the College of Education does not have a concentration in this degree program, we recognize the benefit this program will have to the university and its students.

Sincerely,

Teresa Jayroe

Digitally signed by Teresa Jayroe
DN: cn=Teresa Jayroe, o=Mississippi State University, ou=College of Education, email=tjayroe@colled.msstate.edu, c=US
Date: 2022.03.09 06:26:11 -06'00'

Dr. Teresa Jayroe

Dean

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY
COLLEGE OF ENGINEERING

DR. JASON M. KEITH

Dean and Professor
Earnest W. and Mary Ann Deavenport, Jr. Chair
keith@bagley.msstate.edu

March 3, 2022

Dr. Mimmo Parisi
Office of the Provost & Executive Vice President
Mississippi State University
Mississippi State, MS 39759

Dear Dr. Parisi,

I support the proposed Bachelor of Science in Data Science. As a contributor to both the curriculum core and concentration areas, we will need additional faculty resources to be able to teach the classes on the degree proposal.

Best Regards,

Jason M. Keith
Dean and Professor
Earnest W. and Mary Ann Deavenport, Jr. Chair

MISSISSIPPI STATE UNIVERSITY.

MISSISSIPPI AGRICULTURAL & FORESTRY EXPERIMENT STATION
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Box 9760
Mississippi State, MS 39762
P. 662.325.2110
cals.msstate.edu

March 8, 2022

TO: Mimmo Parisi
Office of the Provost and Executive Vice President

FROM: Scott T. Willard
Dean – College of Agriculture and Life Sciences

Re: UCCC Submission of the Bachelor of Science in Data Science
Concentration: Computational Agriculture and Natural Resources

Dear Mimmo and Curriculum Committee Members:

The College of Agriculture and Life Sciences is in full support of the submission of the interdisciplinary Bachelor of Science in Data Science. Our college also welcomes our participation by hosting a concentration within this degree program, in cooperation with the College of Forest Resources, entitled, "Computational Agriculture and Natural Resources". We have submitted this concentration for consideration by the committee as they review this degree program, and have involved our department heads, relevant faculty, and course instructors where relevant to assure our ability to offer classes and content within this program.

Should you require anything further regarding this submission or the participation of the College of Agriculture and Life Sciences please do not hesitate to contact me. We are in support of this effort and appreciate the opportunity to be included in this data science initiative aimed at training and informing students in this area for the future.

Thank you.

Sincerely,

Scott T. Willard
Dean, College of Agriculture and Life Sciences
Director, Mississippi Agricultural and Forestry Experiment Station

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF BUSINESS
Office of the Dean
P.O. Box 5288
114 McCool Hall
Mississippi State, MS 39762
P. 662.325.2580
F. 662.325.2410
business.msstate.edu

February 28, 2022

Attention UCCC:

With this letter I am pledging the support of the College of Business for the new Data Science Program. I further am in support of the identified concentration areas, contingent on there being sufficient resources available to offer the proposed concentrations.

Sincerely,

Sharon L. Oswald
Dean, College of Business

MISSISSIPPI STATE UNIVERSITY.

COLLEGE OF FOREST RESOURCES
FOREST AND WILDLIFE RESEARCH CENTER
Dean and Director's Office
Box 9680
Mississippi State, MS 39762
P. 662.325.2953
cfr.msstate.edu

3/8/2022

Office of the Provost and Executive Vice President
3501 Lee Hall
PO Box BQ
262 Lee Boulevard
Mississippi State, MS 39762

Dr. Parisi:

On behalf of the College of Forest Resources (CFR), I am pleased to provide this letter of support for the proposed Bachelor of Science in Data Science. This new 123-hour inter-disciplinary degree program was developed with input from faculty within the CFR. As proposed, the Agriculture and Natural Resources concentration includes courses taught within CFR Departments of Forestry, Sustainable Bioproducts, and Wildlife, Fisheries, and Aquaculture. This degree program will allow quantitatively strong students with an interest in Food, Agriculture, and Natural Resources the opportunity to develop the skills and disciplinary expertise required to work in the rapidly evolving fields of digital agriculture, quantitative ecology, and forest biometry. This combination of skills will uniquely position these MSU graduates to be highly competitive in the emerging field of data science that transcends myriad science disciplines, including Ag and Natural Resources.

As such, the Departments within the CFR enthusiastically support this proposed degree program in Data Science and commit to offering the courses identified in the Agriculture and Natural Resources concentration.

Please feel free to contact me if you need additional information.

Sincerely,

L. Wes Burger
Dean, College of Forest Resources

MISSISSIPPI STATE UNIVERSITY™

COLLEGE OF ARCHITECTURE, ART AND DESIGN
OFFICE OF THE DEAN
P.O. Box AQ
240 Giles Hall | 899 Collegeview Street
Mississippi State, MS 39762
P. 662.325.2202
F. 662.325.8872
caad.msstate.edu

4 March 2022

Dr. Mimmo Parisi
Members of the University Data Science Program Committee
Members of the University Committee on Courses and Curricula
Mississippi State University

Dear Dr. Parisi and others,

I am writing to express the College of Architecture, Art, & Design's support for the addition of the Bachelor of Science in Data Science and specifically the inclusion of the concentration, Visualization and Visual Analytics for the Built Environment. Our college Data Science Working Committee is a representative body of faculty from each of the four academic units in the college. They as a collective group, with the assistance of our Associate Dean of Research, Dr. Balakrishnan, have developed and proposed the curriculum of the concentration after robust discussion and communication with all units in the college. The committee members have shared the proposal with their respective units, and we have worked closely with the directors and department heads in the college as the concentration and its courses were finalized. Once approved, and with the hope and expectation of sufficient resources, we are pleased to be a part of this new interdisciplinary university degree program.

Please do not hesitate to contact me if you need additional information, or if you have any questions.

Sincerely,

Angi Elsea Bourgeois, Ph.D.
Dean and Professor
College of Architecture, Art, & Design
Mississippi State University

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF ARTS & SCIENCES
Office of the Dean

P.O. Box AS
Mississippi State, MS 39762

P. 662.325.2646
F. 662.325.8740
www.cas.msstate.edu

March 7, 2022

Dear Dr. Perkins and Members of the University Committee on Courses and Curriculum,

The College of Arts & Sciences has been asked to participate in the proposed curriculum for the Bachelor of Science in Data Science degree program. Along with providing the majority of the university general education core, and a substantial part of the DSCI major core in Mathematics, Statistics, and Communication, A&S will also offer five concentrations within the major: Social Data Analytics, Psychoinformatics, Statistical Modeling, Geosciences – Meteorology, and Geosciences – Environmental.

At present, we do not have the resources to accommodate the anticipated number of data science majors in these courses or concentrations. However, provided sufficient funding for additional faculty to accommodate the data science majors, we would be pleased to participate in this new degree program.

Sincerely,

Dr. Rick Travis
Dean, College of Arts & Sciences

MISSISSIPPI STATE UNIVERSITY™
UNIVERSITY LIBRARIES

March 7, 2022

Mimmo Parisi
Senior Advisor European Development
Professor
Mississippi State University

Dear Dr. Parisi,

I fully support the addition of the Bachelor of Science in Data Science to Mississippi State University's existing degree offerings. This is an exciting step for Mississippi State University in expanding its curriculum to meet the needs of employers and the changing research needs within the diverse fields of academia.

I look forward to seeing how the MSU Libraries can play a role in the development of this program.

Kind regards,

Lis Pankl, PhD
Professor and Dean of Libraries

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF VETERINARY MEDICINE
Office of the Dean

P.O. Box 6100
240 Wise Center Drive
Mississippi State, MS 39762

P. 662.325.1131
www.cvm.msstate.edu

March 3, 2022

Dr. Mimmo Parisi
Office of the Provost and Executive Vice President
PO Box BQ
3500 Lee Hall
Mississippi State, MS 39762

Dear Dr. Parisi:

I am writing in support of the proposed Bachelor of Science in Data Science as an addition to the University's degree offerings. This new degree program is an inter-college program with three general areas of coursework drawing on a variety of disciplines from across campus. Careers in data science are becoming increasingly important and it is likely that this program will be in high demand among incoming undergraduate students. I believe that an undergraduate student graduating with a major in data science is currently very marketable and will be even more so in the future.

Students in the data science program choose an area of concentration from among a number of concentrations designed by participating colleges. The College of Veterinary Medicine does not currently plan to have a concentration in data science because we do not have an undergraduate educational program except for clinical training of veterinary technicians. However, we do have faculty engaged in medical data science and I hope that some data science graduates matriculate into our graduate programs or ultimately join our research faculty.

Thanks to you and the University Date Science Program Committee for developing this valuable and comprehensive undergraduate degree offering.

Sincerely,

(on behalf of Kent Hoblet, Dean)

Kent Hoblet, Dean

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: Academic Affair Department: Office of the Provost and executive Vice President

Contact Person: Dr. Mimmo Parisi **Mail Stop:** 9723 **Email:** m.parisi@msstate.edu
Nature of Change: Certificate **Date Initiated:** 03/10/22 **Effective Date:** Fall 2022

New Degree Program Name: Graduate Certificate for Data Science Pedagogy

Major: Data Science

Summary of Proposed Changes:
The Office of the Provost and Executive Vice President requests that the new Graduate Certificate for Data Science Pedagogy be offered.

Approved:	**Date:**
Department Head	03/07/2022
N/A	
Chair, College or School Curriculum Committee	
Peter L. Ryan	4th March, 2022
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

NEW DEGREE OUTLINE FORM

Use the chart below to indicate your new degree outline. If any General Education (Core) course is acceptable in the category, please indicate by saying "any Gen Ed course." There is no need to type in the whole list. Expand rows as needed.

PROPOSED New Degree

Degree: Graduate Certificate for Data Science Pedagogy
Major: Data Science
Concentration

New Degree Description

The Graduate Certificate in Data Science Pedagogy is a program that requires a minimum of 12 credit hours and is designed to prepare K-14 instructors to integrate data science into instruction with the overall goal of preparing students to meet the growing demand for data science expertise in the context of ongoing digital transformation of industry: the process by which firms integrate digital technology into every aspect of operations and bring value to customers. To be credentialed to deliver data science instruction at the higher education level, students are required to take a minimum additional of 6 credit hours of course work to be selected by the students and approved by the Data Science Pedagogy Graduate Certificate committee. Organizations in every industry, including education, that do not embrace digital transform will struggle to survive the fourth industrial revolution with its blurring of boundaries between physical and digital worlds. To remain competitive in this environment, Mississippi businesses require middle-skill and high-skill data science experts. Mississippi's education and workforce development system must meet this growing demand to remain economically competitive. Yet Mississippi's educators, like those in the rest of the nation, lack adequate preparation to infuse data science into their curricula and instruction. To meet this need, the certificate includes coursework with the twofold purpose of (1) helping instructors become literate in the field of data science by understanding the role data science experts play in improving the performance of institutions, organizations, business, and society; and (2) teaching instructors how to teach the practice of data science in their own classrooms, regardless of subject.

Proposed Curriculum Outline	Required Hours
DSCI 8013 Data Science Literacy Pedagogy 1: Governance, Ethics, and Data Science Applications. General subject-matter introduction to the field of data science and data science instruction with a focus on governance, ethics, and data science applications in many fields.	3
DSCI 8023 Data Science Literacy Pedagogy 2: Technical Overview of Data Science Methods and Strategies. General subject-matter introduction to the field of data science and data science instruction with a focus on data science methods and practices.	3
DSCI 8033 Data Science Classroom Integration Applying and integrating principles of data science into the context of the classroom. Topics include importance of data science across the domain; digital citizenship; career exploration; and an historical perspective on analyzing, posing, and solving problems using data.	3
CSE 8423 Data Science: Concepts and Practice This course introduces the fundamental concepts of data science, covering data	3

representation and transformation, visual data analysis, statistical modeling, tidy and relational data, functional data-flow programming, and communicating results. The course introduces the practice of data science, using standard data science tools and languages.	
Total Hours	12

Students who complete the Graduate Certificate in Data Science Pedagogy will be able to:

- Define data science as a field of inquiry and an industry sector.
- Outline the role of data science in the context of digital transformation of institutions, organizations, businesses, and society.
- Outline data science methods and practices in the context of the entire data lifecycle including the production, acquisition, storage, and use of data to solve human problems.
- Apply and integrate principles of data science into classroom instruction.

Assessment will be realized through the Institutional Effectiveness report process. External reviewers will also be identified to conduct periodic self-studies.

SUPPORT: Letters of support from the Data Science Committee for Instruction development and Department Head of Computer Science

PROPOSED 4-LETTER ABBREVIATION: DSCI

EFFECTIVE DATE Fall 2022

CIP NUMBER: 30.7001

Appendix 16: Intent to Offer, Modify, or Delete Certificate* Program
(Submit Appendix 16 in both PDF and Word Document Formats)

Institution:

Date of Implementation:	**Six-Digit CIP Code (& Four-Digit Sequence Code if modification/deletion):**	**Total Credit Hours:**
Fall 2022	30.7001 CIP & Sequence codes: IHL Active Program Inventory	Minimum 12 Hours

Program Title as will Appear on Academic Program Inventory: ☒ **Offer** ☐ **Modify** ☐ **Delete**
Certificate of Data Science Pedagogy

Responsible Academic Unit(s):
Division of Academic Affairs
Office of the Provost and Executive Vice President

Institutional Contact: Peter L. Ryan / Mimmo Parisi
Phone: 662-325-3742
Email: ryan@provost.msstate.edu/ m.parisi@msstate.edu

Vocational Certificate: No

Credit Bearing Program: Yes
Yes

Title IV Financial Aid Eligible:
X Yes
No

Which of the following best describes the certificate program: Post-Baccalaureate

Post-Baccalaureate	Undergraduate program with duration less than one academic year; designed for completion in less than 30 credit hours Undergraduate program with duration at least 1 year; designed for completion in at least 30 hours; does not meet requirements for Associate's or Bachelor's degrees **Program designed beyond the baccalaureate degree but does not meet the requirements for a master's degree** Program designed beyond the master's degree but does not meet the requirements for a doctoral degree Other certificate program not meeting one of the four criteria above.

Program Summary:

The Graduate Certificate in Data Science Pedagogy is a program that requires a minimum of 12 credit hours and is designed to prepare K-14 instructors to integrate data science into instruction with the overall goal of preparing students to meet the growing demand for data science expertise in the context of ongoing digital transformation of industry: the process by which firms integrate digital technology into every aspect of operations and bring value to customers. To be credentialed to deliver data science instruction at the higher education level, students are required to take a minimum additional of 6 credit hours of course work to be selected by the students and approved by the Data Science Pedagogy Graduate Certificate committee. Organizations in every industry, including education, that do not embrace digital transform will struggle to survive the fourth industrial revolution with its blurring of boundaries between physical and digital worlds. To remain competitive in this environment, Mississippi businesses require middle-skill and high-skill data science experts. Mississippi's education and workforce development system must meet this growing demand to remain economically competitive. Yet Mississippi's educators, like those in the rest of the nation, lack adequate preparation to infuse data science into their curricula and instruction. To meet this need, the certificate includes coursework with the twofold purpose of (1) helping instructors become literate in the field of data science by understanding the role data science experts play in improving the performance of institutions, organizations, business, and society; and (2) teaching instructors how to teach the practice of data science in their own classrooms, regardless of subject.

Institutional Contact Signature **Date**

Chief Academic Officer Signature **Date**

*Certificate programs added to the Academic Program Inventory must be credit-bearing and be vocational in nature with some professional benefit to program completers. Undergraduate certificates are eligible for Title IV financial aid programs. Certificate programs that are not credit-bearing or are lifelong learning in nature (i.e. photography, travel, etc.) with no professional component should not be included in the Academic Program Inventory.

MISSISSIPPI STATE UNIVERSITY

Office of the Provost and Executive Vice President
P.O. Box BQ
3500 Lee Hall
Mississippi State, MS 39762

P. 662.325.3742
F. 662.325.4039

March 7, 2022

University Committee on Courses and Curricula
PO Box 5268
Mississippi State, MS 39762

Dear Committee:

The Data Science Pedagogy Graduate Certificate committee supports the attached proposal for a new certificate program.

Please feel free to contact us if there are any questions or concerns.

Sincerely,

Jonathan Barlow, PhD
Associate Director for Architecture and Development
NSPARC

Andy D. Perkins, PhD
Associate Department Head
Professor of Computer Science and Engineering

Dana Pomykal Franz, PhD
Director of Academic Quality
Professor of Mathematics Education

J. Edward Swan II, PhD
Professor of Computer Science and Engineering

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Dr.T.J. Jankun-Kelly
Associate Professor & Graduate Coordinator
tjk@cse.msstate.edu

March 3, 2022

Dr. Andy Perkins
Chair
UCCC

Dr. Perkins,

I write this letter in support of the proposed Graduate Certificate in Data Science Education. In consultation with the course instructor and Department head, the Department of Computer Science and Engineering supports allowing CSE 8423 Data Science: Concepts & Practice be used as a required course in the program. We anticipate five (5) students per year based upon this program from the online campus.

Sincerely yours,

Dr. T.J. Jankun-Kelly
Associate Professor and Director of Graduate Studies

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: College of Ag and Life Sciences

Department: Food Science, Nutrition, and Health Promotion (**FSNHP)**

Contact Person: Mandy Conrad

Mail Stop: 9805 **E-mail:** agc8@msstate.edu

Nature of Change: Degree Program Mod.

Date Initiated: 12/21 **Effective Date:** 6/22

Current Degree Program Name:
Major: Food Science, Nutrition and Health Promotion, Concentration: Food and Nutrition

New Degree Program Name: No Change

Major: No Change

Concentration: No Change

Summary of Proposed Changes:

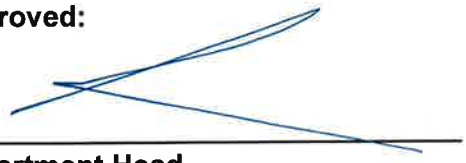
- The purpose of the proposed program modification is related to the program's status as an accredited Didactic Program in Dietetics (DPD) through the Accreditation Council for Education in Nutrition and Dietetics (ACEND), the accrediting agency for programs preparing students for careers as Registered Dietitians. New 2022 DPD Accreditation Standards were released in September 2021 and will go into effect June 1, 2022. To comply with the updated standards and prepare students to meet knowledge requirements and professional competencies for future practice in dietetics, the Food and Nutrition Concentration was reviewed and revised resulting in the following degree program changes.

- **Degree Program Changes FSNHP – Food and Nutrition Concentration:**
- Course addition FNH 2201 Nutrition and Dietetics Career Planning
- Course addition FNH 4323 Professional Skills for Nutrition and Dietetics
- Course modification FNH 4123
    - Course title change
    - Add Campus 5 Delivery
- Course modification FNH 4233
    - Course title change
    - Add Campus 5 Delivery
- Concentration hours increased
    - Current curriculum 60 hours
    - Proposed curriculum 62 hours (MGT 3114 changed to MGT 3113; FNH 4323 added (net = + 2 credits)

    - FNH 2201 replaces current FNH 3701
- Free elective hours decreased
    - Current curriculum 8 hours of free elective
    - Proposed curriculum 6 hours of free elective
    - Total degree hours remain 124 credits

The two added courses (FNH 2201 Nutrition and Dietetics Career Planning, FNH 4323 Professional Skills for Nutrition and Dietetics) will be required concentration courses. The two modified courses (FNH 4123, FNH 4233) will remain required concentration courses. The FNH 3701 NTR Professional Develop course will no longer be required. Students will benefit from the degree program changes, which are required meet the 2022 Standards and maintain DPD accreditation. Specifically, the added course focuses on a new standard domain for "Leadership and Career Management: Skills, strengths, knowledge and experience relevant to leadership potential and professional growth for nutrition and dietetic practitioners." Students will also benefit from two course title changes that are consistent with course titles used in other DPD curriculum and emphasize course sequencing and linear progression, which supports better learning outcomes. Last, expanding delivery to Campus 5 will allow more flexibility in scheduling and outreach to traditional and non-traditional students.

Approved: **Date:**



1/12/22

Department Head

2/28/2022

Chair, College or School Curriculum Committee

3/07/2022

Dean of College or School

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing undergraduate degree outline. If any General Education (Core) course is acceptable in the category, please indicate by saying "any Gen Ed course". There is no need to type in the whole list. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Include the course prefix, number, and title in both columns. Expand this table as needed.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Food Science, Nutrition, and Health Promotion Concentration: Food and Nutrition	Degree: Bachelor of Science Major: Food Science, Nutrition, and Health Promotion Concentration: Food and Nutrition
The Food Science, Nutrition and Health Promotion major offers the opportunity to gain a broad education in food science, nutrition, and health, as well as the specific academic background to pursue careers as food scientists and dietitians/nutritionists. It involves the integration of new knowledge and advances in technology and the physical and biological sciences with psychological, sociological, and behavioral sciences in the provision of a safe, nutritious food supply. Research, teaching, and outreach extend the continuum from the processing of food to its marketing, consumption, and impact on public health and community.	The Food Science, Nutrition and Health Promotion major offers the opportunity to gain a broad education in food science, nutrition, and health, as well as the specific academic background to pursue careers as food scientists and dietitians/nutritionists. It involves the integration of new knowledge and advances in technology and the physical and biological sciences with psychological, sociological, and behavioral sciences in the provision of a safe, nutritious food supply. Research, teaching, and outreach extend the continuum from the processing of food to its marketing, consumption, and impact on public health and community.
The Food and Nutrition concentration in the Food Science, Nutrition, and Health Promotion major is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics (formerly the American Dietetic Association (ADA)) as a Didactic Program in Dietetics (DPD). Successful completion of the bachelor's degree in the Nutrition concentration at MSU qualifies students to compete for placement in ACEND-accredited supervised practice programs (most commonly dietetic internships), which are a required *next* step toward earning the Registered Dietician/Nutritionist (RDN) credential.	The Food and Nutrition concentration in the Food Science, Nutrition, and Health Promotion major is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics (formerly the American Dietetic Association (ADA)) as a Didactic Program in Dietetics (DPD). Successful completion of the bachelor's degree in the **Food and** Nutrition concentration at MSU qualifies students to compete for placement in ACEND-accredited supervised practice programs (most commonly dietetic internships), which are a required step toward earning the **Registered Dietitian Nutritionist (RDN)** credential.

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English (Ex: EN 1103 English Comp I): EN 1103 English Comp I OR EN 1163 Accelerated Comp I EN 1113 English Comp II OR EN 1173 Accelerated Comp II	6	English (Ex: EN 1103 English Comp I): EN 1103 English Comp I OR EN 1163 Accelerated Comp 1 EN 1113 English Comp II OR EN 1173 Accelerated Comp II	6
Fine Arts (General Education): Any Gen Ed Course	3	Fine Arts (General Education): Any Gen Ed Course	3
Natural Sciences BIO 3304 Gen Microbiology CH 1211 Investigations in Chemistry I	12	Natural Sciences BIO 3304 Gen Microbiology CH 1211 Investigations in Chemistry I	12

CH 1213 Chemistry I CH 1221 Investigations of Chemistry II CH 1223 Chemistry II		CH 1213 Chemistry I CH 1221 Investigations of Chemistry II CH 1223 Chemistry II	
Extra Science (if appropriate)		Extra Science (if appropriate)	
Math (General Education): MA 1313 College Algebra OR MA 1713 Calculus I OR MA 1613 Cal Bus & Life Sc I OR MA1463 Fin Ma & Intro Cal ST 2113 Introduction to Statistics OR BQA 2113 Bus Stat Methods I OR ST 3123 Into to Stat. Inf.	6	Math (General Education): MA 1313 College Algebra OR MA 1103 College Algebra Co-req OR MA 1713 Calculus I OR MA 1613 Cal Bus & Life Sc I OR MA1463 Fin Ma & Intro Cal ST 2113 Introduction to Statistics OR BQA 2113 Bus Stat Methods I OR ST 3123 Into to Stat. Inf.	6
Humanities (General Education): Any Gen Ed Courses	6	Humanities (General Education): Any Gen Ed Courses	6
Social/Behavioral Sciences (Gen Ed): PSY 1013 Gen Psychology SO 1003 Intro to Sociology OR SO 1103 Contemporary Social Problems OR SO 1203 Sociology of Families	6	Social/Behavioral Sciences (Gen Ed): PSY 1013 Gen Psychology SO 1003 Intro to Sociology OR SO 1103 Contemporary Social Problems OR SO 1203 Sociology of Families	6
Major Core Courses: CH 2501 Elem Org Chem Lab OR CH 4511 Organic Chem Lab I CH 2503 Elem Org Chem OR CH 4513 Organic Chem I FNH 2293 Individual and Family Nutrition FNH 3111 FNH Seminar FNH 4243 Food Composition and Reactions MGT 3513 Intro to Human Resource Management CO 1003 Fundamentals of Public Speaking OR CO 1013 Introduction to Communication OR CO 2213 Small Group Communication OR Co 3213 Small Group Communication	17	Major Core Courses: CH 2501 Elem Org Chem Lab OR CH 4511 Organic Chem Lab I CH 2503 Elem Org Chem OR CH 4513 Organic Chem I FNH 2293 Individual and Family Nutrition FNH 3111 FNH Seminar FNH 4243 Food Composition and Reactions MGT 3513 Intro to Human Resource Management CO 1003 Fundamentals of Public Speaking OR CO 1013 Introduction to Communication OR CO 2213 Small Group Communication OR CO 3213 Small Group Communication	17
Concentration Courses: BCH 4013 Principles of Biochemistry BIO 1134 Biology I BIO 3004 Human Anatomy	*60*	Concentration Courses: BCH 4013 Principles of Biochemistry BIO 1134 Biology I BIO 3004 Human Anatomy	**62**

BIO 3014 Human Physiology FNH 2203 Science of Food Prep FNH 3283 The Foodservice System *FNH 3701 NTR Professional Develop* FNH 3723 Community Nutrition FNH 4013 Nutrition Assessment FNH 4123 *Nutrition and Chronic Disease* FNH 4233 *Medical Nutrition Therapy* FNH 4253 Macronutrients FNH 4284 Quantity Food Prod & Serv FNH 4293 Micronutrients FNH 4353 Nutrition/ Life Cycle FNH 4373 NTR Ed & Counsel Skill FNH 4363 Research Methods in Fd & Ntr KI 2603 Medical Terminology *MGT 3114 Prin of Mgmt*		BIO 3014 Human Physiology FNH 2203 Science of Food Prep FNH 3283 The Foodservice System **FNH 2201 Nutrition and Dietetics Career Planning** FNH 3723 Community Nutrition FNH 4013 Nutrition Assessment FNH 4123 **Medical Nutrition Therapy I** FNH 4233 **Medical Nutrition Therapy II** FNH 4253 Macronutrients FNH 4284 Quantity Food Prod & Serv FNH 4293 Micronutrients FNH 4353 Nutrition/ Life Cycle FNH 4373 NTR Ed & Counsel Skill FNH 4363 Research Methods in Fd & Ntr KI 2603 Medical Terminology **MGT 3113 Prin of Mgt & Prod** **FNH 4323 Professional Skills for Nutrition and Dietetics**	
Electives Free Electives	*8*	Electives Free Electives	**6**
Total Hours	124	Total Hours	124
CURRENT DEGREE		PROPOSED DEGREE	
Degree: Bachelor of Science Major: Food Science, Nutrition, and Health Promotion Concentration: Food Processing and Business		No change	
CURRENT Degree Description		PROPOSED DEGREE	
Degree: Bachelor of Science Major: Food Science, Nutrition, and Health Promotion Concentration: Food Science		No Change	
CURRENT Degree Description		PROPOSED DEGREE	
Degree: Bachelor of Science Major: Food Science, Nutrition, and Health Promotion Concentration: Food Safety		No Change	
CURRENT Degree Description		PROPOSED DEGREE	
Degree: Bachelor of Science		No Change	

Major: Food Science, Nutrition, and Health Promotion Concentration: Pre-Health			

MISSISSIPPI STATE UNIVERSITY.

DEPARTMENT OF FOOD SCIENCE, NUTRITION AND HEALTH PROMOTION
P. O. Box 9805
Mississippi State, MS 39762
P. 662.325.3200
fsnhp.msstate.edu

Date: January 10th, 2022

To: Dr. Ashli Brown, Department Head
From: Dr. Wes Schilling, Curriculum Committee Chair

Re: Food and Nutrition Concentration Modification

Dear Dr. Brown,

This letter serves as verification that the Curriculum Committee has approved the Program Modification for the Food and Nutrition Concentration within the Bachelor of Science degree in Food Science, Nutrition, and Health Promotion. These individual modifications include

1. The deletion of FNH 3701 2. Addition FNH 2201 Nutrition and Dietetics Career Planning
2. Modification of FNH 4123 Nutrition and Chronic disease to FNH 4123 Medical Nutrition Therapy I
3. Modification of FNH 4233 Medical Nutrition Therapy to FNH 4233 Medical Nutrition Therapy II
4. Addition of FNH 4323 Professional Skills for Nutrition and Dietetics

This program modification and specific course modifications, additions, and deletions were voted on by departmental Nutrition faculty and was approved by a vote of 6 yes votes and 0 no votes.

Sincerely,

Wes Schilling, PhD
Chair

Antonio Gardner, PhD
Committee Member

Wen-Hsing Cheng, PhD
Committee Member

Leah Pylate, PhD
Committee Member

Terezie Tolar-Peterson, EdD
Committee Member

Shecoya White, PhD
Committee Member

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: College of Ag and Life Sciences **Department**: Plant and Soil Sciences

Contact Person: Richard Harkess **Mail Stop**: 9555 **E-mail**: richard.harkess@msstate.edu

Nature of Change: Add Distance Education option to the existing degree program.
Date Initiated: 7/14/21 **Effective Date**: Fall 2022

Current Degree Program Name: Master of Science
Major: Plant and Soil Sciences **Concentration**: Agronomy, Horticulture, Weed Science

New Degree Program Name: Master of Science
Major: Plant and Soil Sciences **Concentration**: Agronomy, Horticulture, Weed Science

Summary of Proposed Changes:
Add distance education option to the Master of Science Plant and Soil Sciences degree program.

Approved: Date:

Department Head — 2/21/2022

Chair, College or School Curriculum Committee — 2/25/2022

Dean of College or School — 3/3/2022

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

Proposal for an Existing Degree Program to be offered through Distance Education
Master of Science – Plant and Soil Sciences

1. CATALOG DESCRIPTION

   Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and the Doctor of Philosophy degree in Plant and Soil Sciences with a concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered.

   Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to:

   Department Head
   Plant and Soil Sciences
   Box 9555
   Mississippi State, MS 39762

2. **GRADUATE DEGREE MODIFICATION OUTLINE FORM**

   All deleted courses and information are shown in *italics* and all new courses and information in **bold**.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Master of Science Major: Plant and Soil Sciences Concentrations: Agronomy; Horticulture; Weed Science	Degree: Master of Science Major: Plant and Soil Sciences Concentrations: Agronomy; Horticulture; Weed Science
Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and *also to* the Doctor of Philosophy degree in Plant and Soil Sciences with	Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and the Doctor of Philosophy degree in Plant and Soil Sciences with a

a concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered. Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to: Department Head Plant and Soil Sciences Box 9555 Mississippi State, MS 39762	concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered. Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to: Department Head Plant and Soil Sciences Box 9555 Mississippi State, MS 39762

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
College Required Courses No college required courses	0	College Required Courses No college required courses	0
Major Required Courses Graduate level coursework PSS 8811 Seminar[1] ST 8114 Statistical Methods (or other graduate level statistics course)[2]	 12 1 4	Major Required Courses Graduate level coursework PSS 8811 Seminar[1] ST 8114 Statistical Methods (or other graduate level statistics course)[2]	 12 1 4

[1]An exit seminar describing the thesis research is required as part of the credit hours. [2]A graduate-level statistics course is required as part of the credit hours. Students in the Master of Science in Plants and Soils degree program will be required to complete the following before earning their degree. M.S. – Thesis — Students must complete a minimum number of 30 credit hours with 12 credit hours at 8000 level or above plus 6 hours of research/thesis A graduate level statistics course and an exit seminar (PSS 8811) describing the thesis research are required as part of the credit hours. A thesis and an oral thesis defense are required. The graduate committee must approve the thesis topic, research proposal, program of study and final thesis. M.S. - Non-thesis—A student in the M.S. non-thesis option program must successfully complete 30 credit hours of graduate level courses of which at least 15 must be courses numbered 8000 or above. *Three credit hours of Directed Individual Study (PSS 7000) are required, in which the student must develop a research paper approved by the student's graduate committee.* An oral comprehensive exam is required.		[1]An exit seminar describing the thesis research **or non-thesis paper** is required as part of the credit hours. [2]A graduate-level statistics course is required as part of the credit hours. Students in the Master of Science in Plants and Soils degree program will be required to complete the following before earning their degree. M.S. – Thesis — Students must complete a minimum number of 30 credit hours with 12 credit hours at 8000 level or above plus 6 hours of research/thesis A graduate level statistics course and an exit seminar (PSS 8811) describing the thesis research are required as part of the credit hours. A thesis and an oral thesis defense are required. The graduate committee must approve the thesis topic, research proposal, program of study and final thesis. M.S. - Non-thesis—A student in the M.S. non-thesis option program must successfully complete 30 credit hours of graduate level courses of which at least 15 must be courses numbered 8000 or above. An oral comprehensive exam is required.	
Concentration 1. Agronomy – Thesis 8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours.	 7 6	Concentration 1. Agronomy – Thesis 8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours.	 7 6

[2]A thesis defense is required.		[2]A thesis defense is required.	
Concentration 1. Agronomy – Non-Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10	Concentration 1. Agronomy – Non-Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10
Concentration 2. Horticulture – Thesis 8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours. [2]A thesis defense is required.	 7 6	Concentration 2. Horticulture – Thesis 8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours. [2]A thesis defense is required.	 7 6
Concentration 2. Horticulture – Non-Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10	Concentration 2. Horticulture – Non-Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10
Concentration 3. Weed Science – Thesis		Concentration 3. Weed Science – Thesis	

8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours. [2]A thesis defense is required.	7 6	8000-level coursework[1] PSS 800X Research/Thesis[2] [1]The total 8000-level coursework credits must equal a minimum of 12 hours. [2]A thesis defense is required.	7 6
Concentration 3. Weed Science – Non- Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10	Concentration 3. Weed Science – Non- Thesis PSS 7000 Dir. Indiv. Study PSS[1] 8000-level coursework[2] [1] The student must develop a research paper approved by the student's graduate committee. In addition, a comprehensive examination over coursework is required. [2]The total 8000-level coursework credits must equal a minimum of 15 hours.	 3 10
Total Hours	30	Total Hours	30

3. JUSTIFICATION FOR DISTANCE LEARNING OFFEREING

Adding a distance education option (campus 5) will open the possibility of reaching a greater number of students needing an advanced degree in Plant Sciences. It will provide flexibility to meet emerging graduate student needs and reach a larger audience. Adding distance education option will make the PSS program accessible to professionals who live away from campus as well as individuals who travel frequently or who may not have access or ability to travel to campus to pursue a graduate degree.

TARGET AUDIENCE

The target audience for the online PSS MS degree is those students who currently work in the field and desire professional development and career advancement opportunities. It includes non-traditional students and/or early/mid-career individuals seeking a terminal degree by distance learning. Specific target audience examples include; non-traditional students, Extension agents/personnel, early/mid-career individuals in agricultural industries, military personnel, and State/Federal employees.

The following courses have been approved for online instruction (either Campus 1 or/and Campus 5) providing a path to obtain the degree online. The department also participates in a course share MOA (ACCEPtS) with three other universities in which the courses are

offered online Campus 1 at Mississippi State University. PSS will add the Campus 5 option to additional courses as the program grows.

The following are PSS courses offered online.
PSS 6013 Prin. Floral Design II (**Campus 5 proposal submitted**)
PSS 6023 Floral Management (Campus 1 online)
PSS 6033 Case Studies in Floral Management (Campus 1 online)
PSS 6043 International Horticulture (Campus 1 online, ACCEPtS)
PSS 6113 Agricultural Crop Physiology (Campus 1 online, ACCEPtS)
PSS 6153 Sustainable Agroecology (Campus 1 online, ACCEPtS)
PSS 6313 Soil Fertility and Fertilizers (Campus 5)
PSS 6333 Soil Conservation and Land Use (Campus 1 online & 5)
PSS 6341 Controlled Environment Agriculture Laboratory (Campus 1 online, ACCEPtS)
PSS 6343 Controlled Environment Agriculture (Campus 1 online, ACCEPtS)
PSS 6363 Sustainable Nursery Production (Campus 1 online, ACCEPtS)
PSS 6383 Agriculture Remote Sensing I (Campus 1 online)
PSS 6443 Athletic Field Mgmt (Campus 1 online, ACCEPtS; **Campus 5 submitted**)
PSS 6453 Vegetable Production (**Campus 5 proposal submitted**)
PSS 6473 Hydroponic and Soilless Crop Production (**Campus 5 proposal submitted**)
PSS 6483 Intro. To Remote Sensing Technologies (Campus 5)
PSS 6553 Plant Growth and Development (Campus 1 online, ACCEPtS)
PSS 6603 Soil Chemistry (Campus 5)
PSS 6833 Temperature Stress Physiology (Campus 1 online, ACCEPtS)
PSS 7000 Directed Individual Study (Campus 5)
PSS 8012 Thesis Proposal Writing (Campus 1 online)
PSS 8103 Pasture Development (Campus 5)
PSS 8123 Crop Ecology (Campus 5)
PSS 8333 Advanced Soil Fertility (Campus 5)
PSS 8343 Soil Plant Atmosphere Relationships (Campus 5)
PSS 8553 Phytohormones and Growth Regulation (**Campus 5 proposal submitted**)

The following Statistics courses have been approved for Campus 5 and may satisfy the Graduate Statistics requirements if offered.
ST 8114 Statistical Methods (Campus 5)
ST 8123 Statistical Thinking: Prob. Models & Theory of Stats (Campus 5)
ST 8253 Regression Analysis (Campus 5)

4. LEARNING OUTCOMES (No change from current program and will be the same for in-person and online students)

Expected Learning Outcomes

1. Students will be able to demonstrate a broad-based knowledge in their respective discipline.
2. Students will demonstrate a broad-based knowledge related to identification and management of issues in Mississippi and how these relate to issues regionally and globally within their respective discipline.
3. Students will know and understand current trends and important issues within

their respective discipline.

4. Students will have a working knowledge of research methodology, experimental design, data management and interpretation.
5. Students will be able to communicate effectively with clientele and peers in their disciplines.

5. EFFECTIVE DATE
   Spring 2022

6. CONTACT PERSON
   Richard L. Harkess
   662-325-4556
   richard.harkess@msstate.edu

7. SUPPORT
   A letter of support is included from the Department of Plant and Soil Sciences Courses and Curriculum Committee.

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF AGRICULTURE & LIFE SCIENCES
Department of Plant and Soil Sciences

117 Dorman Hall, Box 9555
32 Creelman Street
Mississippi State, MS 39762

P. 662.325.2311
F. 662.325.8742
www.pss.msstate.edu

24 January 2022

University Courses & Curriculum Committee
Andy Perkins, Chair
281 Garner Hall;
Post Office Box 5268
Mailstop: 9702
Mississippi State, MS 39762

UCCC:

The PSS CCC met as a committee to discuss the proposed addition of Campus 5 Distance Education to our Masters and Doctorate degree programs. After review and discussion with the committee and input from department faculty, the PSS Curriculum Committee voted unanimously to support the addition of the Campus 5 Distance Education degree programs. The committee determined the addition of Distance Education degree option reflects current teaching practices, is relevant to student needs, and will fulfill department constituent needs. These programs do not represent a duplication of effort from other programs offered at Mississippi State University.

Sincerely,

Richard L Harkess

Richard L. Harkess, Chair

Plant and Soil Sciences Courses & Curriculum Committee

PSS CCCommittee:

Michael Cox
Michael Cox

William
William Kingery

Fred Musser
Fred Musser

Cole Etheredge
Cole Etheredge

David Lang
David Lang

Barry Stewart
Barry Stewart

Darrin M. Dodds
Darrin Dodds, Dept. Head, PSS

c: Cindy Williams, Administrative Assistant

Signature: Michael Cox
Michael Cox (Jan 24, 2022 12:42 CST)

Email: msc15@msstate.edu

Signature: Fred Musser
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Signature: Barry Stewart
Barry Stewart (Feb 1, 2022 11:30 CST)

Email: brs40@msstate.edu

Signature:

Email: rlh18@msstate.edu

PSS CCC Support letter Online Grad Degree Programs

Final Audit Report 2022-02-01

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Signature Date: 2022-02-01 - 8:44:27 PM GMT - Time Source: server- IP address: 130.18.201.102

Agreement completed.
2022-02-01 - 8:44:27 PM GMT

Appendix 10: Report of Intent to Offer an Existing Degree Program by Distance Learning

(Submit Appendix 10 in PDF format with signatures)

Institution: Mississippi State University

Date of Initial Program Approval:	Date of Implementation:	Cost to Offer by Distance Learning:
Fall 2015	Spring 2016	$2,000

Program Title as It Appears on Academic Program Inventory, Diploma, and Transcript:

Plant and Soil Sciences Master of Science

Six-Digit CIP Code(s) & Four-Digit Sequence Code(s):

01.1101

CIP & Sequence codes: III. Active Program Inventory

Degree(s) to be Awarded:

Master of Science

Credit Hour Requirements:

30

Can this program be completed entirely online? ☒ Yes ☐ No

Will this program require separate admission from those offered on-campus? ☐ Yes ☒ No

Responsible Academic Unit(s):

Department of Plant and Soil Sciences

Institutional Contact: Dr. Darrin Dodds
Phone: 662-325-2698
Email: dmd76@msstate.edu

Number of Students Expected to Enroll in First Six Years:

Year One	4
Year Two	8
Year Three	8
Year Four	8
Year Five	8
Year Six	8
Total	44

Number of Graduates Expected in First Six Years:

Year One	0
Year Two	4
Year Three	8
Year Four	8
Year Five	8
Year Six	8
Total	36

Program Summary:

This degree modification will add the option of distance education. Students choosing this option will have the ability to complete their degree online under the supervision of graduate faculty in the department. An online option will open the degree program to a wider population seeking graduate education in the Plant and Soil Sciences and provide opportunity for industry/University collaboration.

Chief Academic Officer Signature

2-3-22
Date

Institutional Executive Officer Signature

2-3-22
Date

MISSISSIPPI STATE UNIVERSITY

Office of the Provost and
Executive Vice President
P. O. Box BQ
3500 Lee Hall
Mississippi State, MS 39762-5566
P: 662.325.3742
F: 662.325.4039

February 24, 2022

IHL BOARD NOTIFICATION

TO: Scott Willard
Dean, College of Ag & Life Sciences

FROM: David Shaw
Provost and Executive Vice President

Please be advised the following *Intent to Offer an Existing Degree Program by Distance Learning* submitted to the Mississippi Board of Trustees of State Institutions of Higher Learning for their Information agenda has been accepted.

- Master of Science in Plant & Soil Sciences *(CIP 01.1101)*
- Doctor of Philosophy in Plant & Soil Sciences *(CIP 01.1101)*

c: Mark Keenum, President
Peter Ryan, Executive Vice Provost & Dean, Graduate School
Keith Coble, VP, DAFVM
Brent Fountain, Vice Provost, Academic Affairs
Jim Dunne, Associate VP, Academic Affairs
John Dickerson, Assistant VP, Enrollment
Emily Shaw, Associate Registrar
Amy Adkerson, Special Projects Coordinator, Registrar's office
Nancy Fultz, Academic Programs Support Manager
Tracey Baham, Assistant VP, Institutional Strategy & Effectiveness
Andy Perkins, Chair, UCCC

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: College of Ag and Life Sciences **Department**: Plant and Soil Sciences

Contact Person: Richard Harkess **Mail Stop**: 9555 **E-mail**: richard.harkess@msstate.edu

Nature of Change: Add Distance Education option to existing degree program
Date Initiated: 7/14/21 **Effective Date**: Fall 2022

Current Degree Program Name: Doctor of Philosophy

Major: Plant and Soil Sciences **Concentration**: Agronomy, Horticulture, Weed Science

New Degree Program Name: Doctor of Philosophy

Major: Plant and Soil Sciences **Concentration**: Agronomy, Horticulture, Weed Science

Summary of Proposed Changes:
Add distance education option to the Doctor of Philosophy Plant and Soil Sciences degree program and expand the biochemistry requirement in the Horticulture concentration.

Approved: Date:

Department Head — 2/2/2022

Chair, College or School Curriculum Committee — 2/25/2022

Dean of College or School — 3/3/2022

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

Proposal for an Existing Degree Program to be offered through Distance Education
Doctor of Philosophy – Plant and Soil Sciences

1. CATALOG DESCRIPTION

   Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and the Doctor of Philosophy degree in Plant and Soil Sciences with a concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered.

   Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to:

   Department Head
   Plant and Soil Sciences
   Box 9555
   Mississippi State, MS 39762

2. **GRADUATE DEGREE MODIFICATION OUTLINE FORM**

   All deleted courses and information are shown in *italics* and all new courses and information in **bold**.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Doctor of Philosophy Major: Plant and Soil Sciences Concentrations: Agronomy; Horticulture; Weed Science	Degree: Doctor of Philosophy Major: Plant and Soil Sciences Concentrations: Agronomy; Horticulture; Weed Science
(NO CHANGE) Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and *also to* the Doctor of	(NO CHANGE) Graduate study offered in the Department of Plant and Soil Sciences leads to the Master of Science in Plant and Soil Sciences degree with concentrations in Agronomy, Horticulture, or Weed Science and the Doctor of Philosophy

Philosophy degree in Plant and Soil Sciences with a concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered. Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to: Department Head Plant and Soil Sciences Box 9555 Mississippi State, MS 39762	degree in Plant and Soil Sciences with a concentration in Agronomy, Horticulture, or Weed Science. The Horticulture concentration within the Plant and Soil Sciences degrees also offers a minor in Floral Management. The department has an extensive research program which provides a diversity of problems for thesis and dissertation research under the supervision of experienced and highly trained scientists. The Department of Plant and Soil Sciences offers graduate programs in Plant Breeding and Genetics, Molecular Biology, Crop Modeling, Agronomy, Soil Science, Crop Physiology, Weed Science, Turfgrass Science, Remote Sensing, and Horticulture. A Precision Agriculture Certificate is also offered. Graduate programs are designed to develop skills in research techniques in reference to the individual needs of each student. This program is developed and administered by a departmental committee within the student's area of specialization and may include courses in mathematics and statistics, biology, chemistry, biochemistry, remote sensing, etc., as well as agronomic, horticultural, and weed science courses. Graduate assistantships are provided, subject to availability of funds. An undergraduate grade average of B or better is required to be eligible for an assistantship. Requests for additional information should be addressed to: Department Head Plant and Soil Sciences Box 9555 Mississippi State, MS 39762

CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
College Required Courses No college required courses	0	College Required Courses No college required courses	0

Major Required Courses		Major Required Courses	
PSS 8821 Seminar[1]	1	PSS 8821 Seminar[1]	1
PSS 8831 Seminar[2]	1	PSS 8831 Seminar[2]	1
PSS 9000 Research/Dissertation[3]	20	PSS 9000 Research/Dissertation[3]	20
[1]The first seminar should be done within the first year of the student's program and should present the research proposal and include a review of relevant literature.		[1]The first seminar should be done within the first year of the student's program and should present the research proposal and include a review of relevant literature.	
[2]An exit seminar will describe the results of the student's dissertation research.		[2]An exit seminar will describe the results of the student's dissertation research.	
[3]Mississippi State University requires all students earn at least 53 hours graduate credit beyond the bachelor's level to include a minimum of 20 dissertation credits.		[3]Mississippi State University requires all students earn at least 53 hours graduate credit beyond the bachelor's level to include a minimum of 20 dissertation credits.	
A qualifying examination may be administered at the beginning of the student's program. The student must successfully complete a program of study as approved by the major advisor and graduate committee. The student must pass a preliminary examination. a written and oral preliminary examination will be administered by the graduate committee after completion or within 6 hours of completing coursework. Original research and a dissertation are required of all candidates for the doctoral degree.		A qualifying examination may be administered at the beginning of the student's program. The student must successfully complete a program of study as approved by the major advisor and graduate committee. The student must pass a preliminary examination. a written and oral preliminary examination will be administered by the graduate committee after completion or within 6 hours of completing coursework. Original research and a dissertation are required of all candidates for the doctoral degree.	
Concentration 1. Agronomy		Concentration 1. Agronomy	
ST 8114 Statistical Methods (or other graduate level statistics course)[1]	4	ST 8114 Statistical Methods (or other graduate level statistics course)[1]	4
Additional graduate-level coursework [2]	14	Additional graduate-level coursework [2]	14

[1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences is 20 hours beyond the Master's degree requirements.		[1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences is 20 hours beyond the Master's degree requirements.	
Total Hours – Agronomy	40	Total Hours – Agronomy	40
Concentration 2. Horticulture BCH 6013 Prin. Biochemistry ST 8214 Design & Anal. Exp. (or other graduate level statistics course)[1] Additional graduate-level coursework [2] [1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences with a Horticulture concentration is 24 hours beyond the Master's degree requirements.	 3 4 15	Concentration 2. Horticulture BCH 6013 Prin. Biochemistry **(or other graduate level biochemistry course)** ST 8214 Design & Anal. Exp. (or other graduate level statistics course)[1] Additional graduate-level coursework [2] [1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences with a Horticulture concentration is 24 hours beyond the Master's degree requirements.	 3 4 15
Total Hours – Horticulture	44	Total Hours – Horticulture	44
Concentration 3. Weed Science ST 8114 Statistical Methods (or other graduate level statistics course)[1] Additional graduate-level coursework [2] [1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences is 20 hours beyond the Master's degree requirements. Up to 9 hours of PSS 8701-8771 Current Topics	 4 14	Concentration 3. Weed Science ST 8114 Statistical Methods (or other graduate level statistics course)[1] Additional graduate-level coursework [2] [1]A graduate-level statistics course is required as part of the credit hours. [2]The minimum coursework required for a PhD in Plant and Soil Sciences is 20 hours beyond the Master's degree requirements. Up to 9 hours of PSS 8701-8771 Current Topics	 4 14

may be included to meet these requirements.		may be included to meet these requirements.	
Total Hours	40	Total Hours	40

3. JUSTIFICATION FOR DISTANCE LEARNING OFFEREING

Adding a distance education option (campus 5) will open the possibility of reaching a greater number of students needing an advanced degree in Plant Sciences. It will provide flexibility to meet emerging graduate student needs and reach a larger audience. Adding distance education option will make the PSS program accessible to professionals who live away from campus as well as individuals who travel frequently or who may not have access or ability to travel to campus to pursue a graduate degree.

TARGET AUDIENCE

The target audience for the online PSS MS degree is those students who currently work in the field and desire professional development and career advancement opportunities. It includes non-traditional students and/or early/mid-career individuals seeking a terminal degree by distance learning. Specific target audience examples include; non-traditional students, Extension agents/personnel, early/mid-career individuals in agricultural industries, military personnel, and State/Federal employees.

The following courses have been approved for online instruction (either Campus 1 or/and Campus 5) providing a path to obtain the degree online. The department also participates in a course share MOA (ACCEPtS) with three other universities in which the courses are offered online Campus 1 at Mississippi State University. PSS will add the Campus 5 option to additional courses as the program grows.

<u>These courses satisfy the Biochemistry requirement for the Horticulture PhD.</u>
BCH 6013 Prin. Biochemistry (Campus 5)
BCH 6903 Plant Biochem & Mol Biol. (Campus 1 online, ACCEPtS and Campus 5)

<u>The following are PSS courses offered online.</u>
PSS 6013 Prin. Floral Design II (**Campus 5 proposal submitted**)
PSS 6023 Floral Management (Campus 1 online)
PSS 6033 Case Studies in Floral Management (Campus 1 online)
PSS 6043 International Horticulture (Campus 1 online, ACCEPtS)
PSS 6113 Agricultural Crop Physiology (Campus 1 online, ACCEPtS)
PSS 6153 Sustainable Agroecology (Campus 1 online, ACCEPtS)
PSS 6313 Soil Fertility and Fertilizers (Campus 5)
PSS 6333 Soil Conservation and Land Use (Campus 1 online & 5)
PSS 6341 Controlled Environment Agriculture Laboratory (Campus 1 online, ACCEPtS)
PSS 6343 Controlled Environment Agriculture (Campus 1 online, ACCEPtS)
PSS 6363 Sustainable Nursery Production (Campus 1 online, ACCEPtS)
PSS 6383 Agriculture Remote Sensing I (Campus 1 online)
PSS 6443 Athletic Field Mgmt (Campus 1 online, ACCEPtS; **Campus 5 submitted**)
PSS 6453 Vegetable Production (**Campus 5 proposal submitted**)
PSS 6473 Hydroponic and Soilless Crop Production (**Campus 5 proposal submitted**)
PSS 6483 Intro. To Remote Sensing Technologies (Campus 5)

PSS 6553 Plant Growth and Development (Campus 1 online, ACCEPtS)
PSS 6603 Soil Chemistry (Campus 5)
PSS 6833 Temperature Stress Physiology (Campus 1 online, ACCEPtS)
PSS 7000 Directed Individual Study (Campus 5)
PSS 8012 Thesis Proposal Writing (Campus 1 online)
PSS 8103 Pasture Development (Campus 5)
PSS 8123 Crop Ecology (Campus 5)
PSS 8333 Advanced Soil Fertility (Campus 5)
PSS 8343 Soil Plant Atmosphere Relationships (Campus 5)
PSS 8553 Phytohormones and Growth Regulation (**Campus 5 proposal submitted**)

The following Statistics courses have been approved for Campus 5 and may satisfy the Graduate Statistics requirements if offered.
ST 8114 Statistical Methods (Campus 5)
ST 8123 Statistical Thinking: Prob. Models & Theory of Stats (Campus 5)
ST 8253 Regression Analysis (Campus 5)

4. LEARNING OUTCOMES (No change from current program and will be the same for in-person and online students)

Expected Learning Outcomes

1. Students will be able to demonstrate a broad based knowledge in their respective discipline.
2. Students will demonstrate a broad based knowledge related to identification and management of issues in Mississippi and how these relate to issues regionally and globally within their respective discipline.
3. Students will know and understand current trends and important issues within their respective discipline.
4. Students will have a working knowledge of research methodology, experimental design, data management and interpretation.
5. Students will be able to communicate effectively with clientele and peers in their disciplines.

Assessment Methods.

Students in the Doctor of Philosophy Plant and Soil Sciences degree program will be required to complete the following before earning their degree.

Ph.D. — A qualifying examination may be administered at the beginning of the student's program to determine deficiencies in prior training. The student must successfully complete a program of study as approved by the major advisor and graduate committee. A minimum number of 20 hours coursework (including a graduate level statistics course, and two seminars (PSS 8821-8831)) and a minimum of 20 hours of research/dissertation (PSS 9000) are required. The first seminar, which should be done in within the first year of the student's program, will present the research proposal and include a review of relevant literature, and the second, or exit seminar, will describe the results of the student's dissertation research. The student must pass a written and oral preliminary exam administered by the graduate committee after completion or within 6 hours of

completing coursework to be considered a doctoral candidate. Original research and a dissertation are required of all candidates for the doctorate. An oral dissertation defense and exam are required. At least one semester of teaching experience is strongly encouraged. The graduate committee must approve the dissertation topic, research proposal, program of study, and final dissertation.

5. EFFECTIVE DATE
   Fall 2022

6. CONTACT PERSON
   Richard Harkess
   662-325-4556
   richard.harkess@msstate.edu

7. SUPPORT
   A letter of support is included from the Department of Plant and Soil Sciences Courses and Curriculum Committee.

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF AGRICULTURE & LIFE SCIENCES
Department of Plant and Soil Sciences

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24 January 2022

University Courses & Curriculum Committee
Andy Perkins, Chair
281 Garner Hall;
Post Office Box 5268
Mailstop: 9702
Mississippi State, MS 39762

UCCC:

The PSS CCC met as a committee to discuss the proposed addition of Campus 5 Distance Education to our Masters and Doctorate degree programs. After review and discussion with the committee and input from department faculty, the PSS Curriculum Committee voted unanimously to support the addition of the Campus 5 Distance Education degree programs. The committee determined the addition of Distance Education degree option reflects current teaching practices, is relevant to student needs, and will fulfill department constituent needs. These programs do not represent a duplication of effort from other programs offered at Mississippi State University.

Sincerely,

Richard L Harkess

Richard L. Harkess, Chair

Plant and Soil Sciences Courses & Curriculum Committee

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PSS CCC Support letter Online Grad Degree Programs

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Document emailed to Darrin M. Dodds (dmd76@msstate.edu) for signature
2022-02-01 - 5:30:33 PM GMT

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2022-02-01 - 5:50:54 PM GMT- IP address: 130.18.201.81

Document e-signed by Darrin M. Dodds (dmd76@msstate.edu)
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2022-02-01 - 8:42:40 PM GMT- IP address: 130.18.201.102

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Signature Date: 2022-02-01 - 8:44:27 PM GMT - Time Source: server- IP address: 130.18.201.102

Agreement completed.
2022-02-01 - 8:44:27 PM GMT

Appendix 10: Report of Intent to Offer an Existing Degree Program by Distance Learning
(Submit Appendix 10 in PDF format with signatures)

Institution: Mississippi State University

Date of Initial Program Approval:	Date of Implementation:	Cost to Offer by Distance Learning:
Fall 2015	Spring 2016	$2,000

Program Title as It Appears on Academic Program Inventory, Diploma, and Transcript: Plant and Soil Sciences Doctor of Philosophy

Six-Digit CIP Code(s) & Four-Digit Sequence Code(s): 01.1101

CIP & Sequence codes: IHL Active Program Inventory

Degree(s) to be Awarded: Doctor of Philosophy

Credit Hour Requirements: 40

Can this program be completed entirely online? ☒ Yes ☐ No

Will this program require separate admission from those offered on-campus? ☐ Yes ☒ No

Responsible Academic Unit(s):
Department of Plant and Soil Sciences

Institutional Contact: Dr. Darrin Dodds
Phone: 662-325-2698
Email: dmd76@msstate.edu

Number of Students Expected to Enroll in First Six Years:

Year One	2
Year Two	4
Year Three	6
Year Four	6
Year Five	6
Year Six	6
Total	30

Number of Graduates Expected in First Six Years:

Year One	0
Year Two	0
Year Three	2
Year Four	4
Year Five	6
Year Six	6
Total	18

Program Summary:

This degree modification will add the option of distance education. Students choosing this option will have the ability to complete their degree online under the supervision of graduate faculty in the department. An online option will open the degree program to a wider population seeking graduate education in the Plant and Soil Sciences and provide opportunity for industry/University collaboration.

David R. Dodds
Chief Academic Officer Signature

2.3.22
Date

Mark Keen
Institutional Executive Officer Signature

2-3-22
Date

MISSISSIPPI STATE UNIVERSITY

Office of the Provost and
Executive Vice President
P. O. Box BQ
3500 Lee Hall
Mississippi State, MS 39762-5566
P: 662.325.3742
F: 662.325.4039

February 24, 2022

IHL BOARD NOTIFICATION

TO: Scott Willard
Dean, College of Ag & Life Sciences

FROM: David Shaw
Provost and Executive Vice President

Please be advised the following *Intent to Offer an Existing Degree Program by Distance Learning* submitted to the Mississippi Board of Trustees of State Institutions of Higher Learning for their Information agenda has been accepted.

- Master of Science in Plant & Soil Sciences *(CIP 01.1101)*
- Doctor of Philosophy in Plant & Soil Sciences *(CIP 01.1101)*

c: Mark Keenum, President
Peter Ryan, Executive Vice Provost & Dean, Graduate School
Keith Coble, VP, DAFVM
Brent Fountain, Vice Provost, Academic Affairs
Jim Dunne, Associate VP, Academic Affairs
John Dickerson, Assistant VP, Enrollment
Emily Shaw, Associate Registrar
Amy Adkerson, Special Projects Coordinator, Registrar's office
Nancy Fultz, Academic Programs Support Manager
Tracey Baham, Assistant VP, Institutional Strategy & Effectiveness
Andy Perkins, Chair, UCCC

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: CALS Department: Human Sciences
Contact Person: Charles Freeman Mail Stop: 9745 E-mail: cf617@msstate.edu
Nature of Change: Modification Date Initiated: SP 2022 Effective Date: FA 2022
Current Degree Program Name: M.S. Fashion Design & Merchandising

Major: Fashion Design & Merchandising Concentration: Design & Product Development or Merchandising
New Degree Program Name:
Major: Concentration:

Summary of Proposed Changes: Changed to course offerings to be more in line with accreditation at the university. We have added a third concentration for research/thesis track students and streamlined our professional/non-thesis concentrations. We have modified 8000 courses and elective offerings to meet the 12/15 8000-level hour requirement for graduation. We have reduced the number of hours to be more in line with current offerings in the school.

Approved: Date:

Michael E. Newman — 2-16-22
Department Head

[signature] — 2/25/2022
Chair, College or School Curriculum Committee

[signature] (Fr. STW) — 3/3/2022
Dean of College or School

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

GRADUATE DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing Graduate Degree. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Please include the course prefix, number, and title in both columns. Expand rows as needed.

CURRENT Degree Description	PROPOSED Degree Description	
Degree: Master of Science (M.S.) Major: Fashion Design and Merchandising Concentration 1: Merchandising Concentration 2: Design and Product Development	Degree: Master of Science (M.S.) Major: Fashion Design and Merchandising Concentration 1: Design and Product Development Concentration 2: Merchandising **Concentration 3: Research in Fashion Design and Merchandising**	
The graduate degree (M.S.) in Fashion Design and Merchandising (FDM) will be offered through the School of Human Sciences at Mississippi State University. FDM is based on an interdisciplinary approach to understand consumers, fashion businesses and fashion and related industries in the context of fashion culture in the society. Graduates will become future leaders in the textile, apparel, and retail industries to promote the economic development of industry sectors that increase the quality of life for people around the world. They will also advance research and policy in areas related to the fashion industry to broaden the effects of academic application of research in practice, as well as governmental actions on the fashion complex. This degree is designed to provide students with an in-depth understanding of the fashion and retail industry, consumer behavior, product development, business principles, and technology applications. Students select a concentration in one of *two areas: Merchandising or Design and Product Development.* Admission Requirements An individual must have a valid admission status in the Office of The Graduate School to secure enrollment. Admission to graduate study is limited to the pursuit of requirements for the degree and the field of study as specified in the student's application and statement of purpose. Qualified applicants for the FDM graduate program are expected to have interests and goals that are consistent with the department's faculty expertise and interests, as well as course offerings. *Once all application materials have been submitted, applicants should contact the FDM graduate coordinator at (662)325-2950 to schedule an interview with members of the FDM graduate faculty. To accommodate international*	The graduate degree (M.S.) in Fashion Design and Merchandising (FDM) will be offered through the School of Human Sciences at Mississippi State University. FDM is based on an interdisciplinary approach to understand consumers, fashion businesses and fashion and related industries in the context of fashion culture in the society. Graduates will become future leaders in the textile, apparel, and retail industries to promote the economic development of industry sectors that increase the quality of life for people around the world. They will also advance research and policy in areas related to the fashion industry to broaden the effects of academic application of research in practice, as well as governmental actions on the fashion complex. This degree is designed to provide students with an in-depth understanding of the fashion and retail industry, consumer behavior, product development, business principles, and technology applications. Students select a concentration in one of **three areas: (1) Design and Product Development (2) Merchandising, and (3) Research in Fashion Design and Merchandising.** Admission Requirements An individual must have a valid admission status in the Office of The Graduate School to secure enrollment. Admission to graduate study is limited to the pursuit of requirements for the degree and the field of study as specified in the student's application and statement of purpose. Qualified applicants for the FDM graduate program are expected to have interests and goals that are consistent with the department's faculty expertise and interests, as well as course offerings. Admission decisions are based on a holistic consideration of the applicant's credentials. For international, non-native speakers of English, a TOEFL score indicative of ability to successfully complete graduate work is required. See English	

applicants, interviews can be conducted using distance technology. Admission decisions are based on a holistic consideration of the applicant's credentials.

For international, non-native speakers of English, a TOEFL score indicative of ability to successfully complete graduate work is required. See English Language Test Score Requirements in the MSU Graduate School catalog for more information.

Master's Admission Requirements

- meet all MSU Graduate School requirements for admission;
- have earned a baccalaureate degree in FDM or a related field;
- *submit Graduate Record Examination (GRE) scores competitive with other applicants;*
- submit three letters of recommendation, with at least two of the letters coming from individuals familiar with the applicant's academic work;
- current resume or CV
- submit a personal statement (500-1,000 words) describing the applicant's purpose for undertaking graduate study, statement of commitment to concentration area (merchandising or design & product development), professional plans, career goals, and detailed research interests.

For those applicants not possessing a B.S. in Fashion Design and Merchandising, admission will be considered on a case-by-case basis. If accepted, those students *will* be required to complete up to four leveling courses from the FDM undergraduate core curriculum.

Design and Product Development:

- FDM 1533 Basic Apparel Construction
- FDM 2524 Textiles for Apparel
- FDM 2593 Product Development II
- FDM 4343 Patternmaking and Design

Merchandising:

- FDM 2333 Intro to Buying and Management
- FDM 2524 Textiles for Apparel
- FDM 3553 Fashion Retail Pricing
- FDM 4533 Merchandise Planning and Buying

Coursework

The master's degree in FDM requires 38 hours of course work and has a thesis and a non-thesis

Language Test Score Requirements in the MSU Graduate Catalog for more information.

Master's Admission Requirements

- meet all MSU Graduate School requirements for admission;
- have earned a baccalaureate degree in FDM or a related field;
- submit three letters of recommendation, with at least two of the letters coming from individuals familiar with the applicant's academic work;
- current resume or CV
- submit a personal statement (500-1,000 words) describing the applicant's purpose for undertaking graduate study, **statement of commitment to concentration area (merchandising, design & product development or research in fashion design and merchandising),** professional plans, career goals, and detailed research interests.

For those applicants not possessing a B.S. in Fashion Design and Merchandising, admission will be considered on a case-by-case basis. If accepted, those students **may** be required to complete up to four leveling courses from the FDM undergraduate core curriculum.

Design and Product Development:

- FDM 1533 Basic Apparel Construction
- FDM 2524 Textiles for Apparel
- FDM 2593 Product Development II
- FDM 4343 Patternmaking and Design

Merchandising:

- FDM 2333 Intro to Buying and Management
- FDM 2524 Textiles for Apparel
- FDM 3553 Fashion Retail Pricing
- FDM 4533 Merchandise Planning and Buying

Coursework

The master's degree in FDM requires **a minimum of 30** hours of course work.

Although the School of Human Sciences does have a limited number of assistantship opportunities, students are responsible for making their own arrangements for financing their graduate studies. For information about financial aid options and/or to complete a Free Application for Federal Student Aid (FAFSA), visit www.sfa.msstate.edu.

option. A specialization will require 12 hours of coursework completed in one of the areas at the master's level *Financing Your Graduate Education* Although the School of Human Sciences does have a limited number of assistantship opportunities, students are responsible for making their own arrangements for financing their graduate studies. For information about financial aid options and/or to complete a Free Application for Federal Student Aid (FAFSA), visit www.sfa.msstate.edu.		
The Merchandising concentration explores the business and product development aspects of the fashion and retail industry from finalized design to the end use by consumers and beyond. Coursework prepares students to conduct in-depth research and analysis in a variety of fields such as merchandising, buying, international trade, fashion business and retail operations. Students learn real-world application through lab experiences in settings that align with the students' career goals. The Design and Product Development concentration explores the creative and product development aspects of the fashion and retail industry from trend innovation and concept to an end-use product and beyond. Coursework prepares students to conduct in-depth research and analysis in a variety of fields such as creative design, technical design, design processes and related creative industries. Students learn real-world application through lab experiences in settings that align with the students' career goals.	The Design and Product Development concentration explores the creative and product development aspects of the fashion and retail industry from trend innovation and concept to an end-use product and beyond. Coursework prepares students to conduct in-depth research and analysis in a variety of fields such as creative design, technical design, design processes and related creative industries. Students learn real-world application through lab experiences in settings that align with the students' career goals. **Students in this concentration will be required to take at least 15 hours of coursework at the 7000/8000 level.** The Merchandising concentration explores the business and product development aspects of the fashion and retail industry from finalized design to the end use by consumers and beyond. Coursework prepares students to conduct in-depth research and analysis in a variety of fields such as merchandising, buying, international trade, fashion business and retail operations. Students learn real-world application through lab experiences in settings that align with the students' career goals. **Students in this concentration will be required to take at least 15 hours of coursework at the 7000/8000 level.** **The Research in Fashion Design and Merchandising concentration prepares a graduate to pursue a Ph.D. in Fashion Design and Merchandising or a related field. Coursework prepares students to conduct research across a variety of disciplines and methods. Students will conduct a research study as part of their final thesis, which is required in**	

		order to graduate with this concentration.		
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours	
College Required Courses *N/A*		**College Required Courses** **N/A**		
Major Required Courses *AELC 8803 App Res Meth to AEE (3)* *EPY 6214 Educational and Psychological Statistics (4)* *FDM 6424 Teaching Methods in Agriculture and Human Sciences (4)* *or* *AELC 8403 Directed Learning Experiences (3) if above course taken at undergraduate level* *FDM 6613 Research in Fashion Consumer Behavior (3)* HDFS 8813 Seminar in HDFS (3) *FDM 8000 Research/thesis (thesis option) (9) or* *FDM 8100 Creative Project (non-thesis option) (9)*	25-26	**Major Required Courses** HDFS 8813 Seminar in HDFS (3) **FDM 8803 Research in FDM (3)**	**6**	
Merchandising Concentration Courses: *FDM 6683 Research and Application in Fashion Entrepreneurship (3)* *FDM 6793 Research and Application in Digital Fashion Retailing (3)* *Restricted Electives (6) ** ** With approval of major professor and graduate committee, select one course related to student area of study.*	12	**Design and Product Development Concentration Courses[1]** **FDM 6443 Advanced Patternmaking and Design (3) OR FDM 6343 Patternmaking & Design (3)[2]** **FDM 6563 Advanced Draping (3) OR FDM 6363 Draping (3)[2]** **FDM 6783 Experimental Fashion Design (3) OR FDM 6593 Creative Design Tech (3)[2]** **FDM 6873 Advanced Computer Design (3) OR FDM 6733 Computer-Aided Design (3)[2]** **FDM 7000 Directed Individual Study (6) OR Courses approved by Graduate Major Professor (6)** **FDM 8100 Creative Project (6)** **[1] All pre-requisites, including undergraduate courses must be met to enroll.** **[2] Undergraduate students enrolled in the Accelerated Program**	**24**	

Design and Product Development Concentration Courses: (Select 4) *FDM 6123: Research and Application in Product Development* *FDM 6443 Advanced Patternmaking and Design (3)* *FDM 6563 Advanced Draping (3)* *FDM 6573: Advanced Portfolio Development* *FDM 6783 Experimental Fashion Design (3)* *FDM 6873 Advanced Computer-Aided Design for Fashion (3)*	12	**Merchandising Concentration Courses[1]** **FDM 6603 Global Sourcing in the Textile and Apparel Industry (3)[2]** **FDM 6613 Research in Fashion Consumer Behavior (3) OR FDM 6513 Fashion Consumer Behavior (3)[2]** **FDM 6683 Research in Fashion Entrepreneurship (3) OR FDM 6583 Fashion Entrepreneurship (3)[2]** **FDM 6793 Research in Digital Fashion Retailing (3)** **FDM 7000 Directed Individual Study (6) OR Courses approved by Graduate Major Professor (6)** **FDM 8100 Creative Project (6)** **[1] All pre-requisites, including undergraduate courses must be met to enroll.** **[2] Undergraduate students enrolled in the Accelerated Program**	**24**	
		Research in Fashion Design and Merchandising Concentration Courses[1] **EPY 6214 Educational and Psychological Statistics (4)** **Two (2) Research Courses approved by Graduate Thesis Committee and Major Professor (6)** **FDM 7000 Directed Individual Study (6)** **FDM 8000 Research/thesis (thesis option) (9)** **[1] All pre-requisites, including undergraduate courses must be met to enroll.** **[2] Undergraduate students enrolled in the Accelerated Program**	**25**	
Total Hours	37-38	Total Hours	**30 – 31**	

3. Justification and Learning Outcomes:

Since our last degree modification in 2019, the FDM graduate program has introduced a variety of non-thesis options for students as well as an accelerated program. Due to the way courses are listed in the catalog and what we offer each semester, there has been some confusion for the students. This modification is an attempt to clarify these issues and account for the accelerated offerings in the graduate catalog. In addition, we have added a concentration with a focus on research in preparing students to pursue a PhD., which we do not offer. Students applying for these programs need to specialize in research and have that clear on their transcript. This new concentration will be focused on preparing them to enter academia or industry as a qualified and well-trained researcher. Lastly, since our last modification, we are offering more courses and have seen an increase in enrollment. This has enabled us to not have the need to rely on courses being taught outside the discipline and this modification cleans up some of the substitutions currently being done through CAPP. Learning objectives for the degree are listed below.

- Students will demonstrate the synergistic, integrative nature of the textile and apparel industries focusing on the apparel production, creative design, product development,

merchandising, and retail operations, and students will apply this understanding to the current issues and opportunities of the globalized fashion and retail industry.

- Students will apply knowledge from their programs of study to the issues of creative design, communication of dress, technical and instructional design communication, and the business of a global fashion and retail industry.
- Students will integrate concepts of global interdependence as they relate to apparel and agriculture in their areas of specialization.
- Students will understand and apply appropriate technologies in addressing issues concerning the global fashion and retail industry.
- Students will understand resource development and sustainability and the impact that those concepts have on the growth of the global fashion and retail industry.

4. Support
Please see the attached letters of support.

5. Proposed 4 Letter Abbreviation
FDM

6. Effective Date
Fall 2022

MISSISSIPPI STATE UNIVERSITY.

SCHOOL OF HUMAN SCIENCES
P. O. Box 9745
Mississippi State, MS 39762
P. 662.325.2950
humansci.msstate.edu

February 16, 2022

Dr. William G Davis
Chair, CALS Curriculum Committee
Mississippi State, MS 39762

Dear Dr. Davis:

The School of Human Sciences Curriculum Committee affirms support for the modified FDM graduate program proposal. The modified proposal is aligned with accreditation requirements.

Sincerely,

Julie Parker
Julie C. Parker, Chair

Charles Freeman
Charles Freeman Member

OP McCubbins
Andrew McCubbins, Member

Carley C. Morrison
Carley Morrison, Member

Chelsea Panse-Barone
Chelsea Panse-Barron, Member

APPROVAL FORM FOR

DEGREE PROGRAMS

MISSISSIPPI STATE UNIVERSITY

College or School: BCoE **Department:** Agricultural & Biological Engineering

Contact Person: Dr. Steven Elder **Mail Stop:** 9632 **E-mail:** selder@abe.msstate.edu

Nature of Change: Modification **Date Initiated: 2/4/2022** **Effective Date: 6/2/2022**

New or Current Degree Program Name: Doctor of Philosophy in Biomedical Engineering

Summary of Proposed Changes:

We propose to add a GPA credit hour requirement specifically for students who have already earned the Master of Science at the time of admission. This will reduce the need for transferring courses and facilitate development of an efficient plan of study.

Approved by: Date:

J Alex Thomasson 15 FEB 2022

Department Head

John Ball, PhD Digitally signed by John Ball, PhD DN: cn=John Ball, PhD, o=MSU, ou=ECE, email=jeball@ece.msstate.edu, c=US Date: 2022.02.15 11:33:56 -06'00' 15 Feb 2022

Chair, College or School Curriculum Committee

for Jason Keith 2/16/2022

Dean, College or School

Chair, University Committee on Courses & Curricula

Chair, Graduate Council (if applicable)

Chair, Deans Council

Doctor of Philosophy in Engineering, Concentration in Biological Engineering

Degree Program Modification

1. Catalog Description

   The proposed modification does not require a change to the catalog description (see below).

2. Curriculum Outline

DEGREE MODIFICATION OUTLINE FORM

CURRENT Degree Description	PROPOSED Degree Description
Degree: Doctor of Philosophy Major: Biomedical Engineering Concentration: None	Degree: Doctor of Philosophy Major: Biomedical Engineering Concentration: None
Department Head: Dr. Alex Thomasson **Graduate Coordinator: Dr. Steven Elder** 100 Ag and Bio Engineering Building Box 9632 Mississippi State, MS 39762 Telephone: (662) 325-3282 E-mail: selder@abe.msstate.edu Website: http://www.abe.msstate.edu An Interdisciplinary Curriculum The interdisciplinary Biomedical Engineering program is administered through Agricultural and Biological Engineering for the College of Engineering. Programs of study and research leading to both the Master of Science and the Doctor of Philosophy degrees in Biomedical Engineering are available. Biomedical Engineering is the engineering discipline that applies engineering principles to study and finds solutions for problems associated with the human body, medicine, and the health care field. At MSU, students can concentrate on research in areas such as injury biomechanics and bio-inspired design, computational modeling, vascular calcification, hemodynamics and sickle cell disease, bone fracture healing, and cartilage regeneration. Admission Criteria Regular admission into the M.S. or Ph.D. programs requires the student meet the following criteria:	**Department Head: Dr. Alex Thomasson** **Graduate Coordinator: Dr. Steven Elder** 100 Ag and Bio Engineering Building Box 9632 Mississippi State, MS 39762 Telephone: (662) 325-3282 E-mail: selder@abe.msstate.edu Website: http://www.abe.msstate.edu An Interdisciplinary Curriculum The interdisciplinary Biomedical Engineering program is administered through Agricultural and Biological Engineering for the College of Engineering. Programs of study and research leading to both the Master of Science and the Doctor of Philosophy degrees in Biomedical Engineering are available. Biomedical Engineering is the engineering discipline that applies engineering principles to study and finds solutions for problems associated with the human body, medicine, and the health care field. At MSU, students can concentrate on research in areas such as injury biomechanics and bio-inspired design, computational modeling, vascular calcification, hemodynamics and sickle cell disease, bone fracture healing, and cartilage regeneration. Admission Criteria Regular admission into the M.S. or Ph.D. programs requires the student meet the following criteria:

Meet the admission requirements of the Graduate School	Meet the admission requirements of the Graduate School
Have earned a bachelor's degree in an engineering discipline	Have earned a bachelor's degree in an engineering discipline
Submit GRE scores	Submit GRE scores
Receive a positive recommendation by the coordinating committee of the biomedical engineering graduate program	Receive a positive recommendation by the coordinating committee of the biomedical engineering graduate program
Be accepted as a student by a member of the biomedical engineering graduate faculty	Be accepted as a student by a member of the biomedical engineering graduate faculty
The student must have a 3.00 grade point average or higher and, if applicable, a TOEFL score of 600 PBT (96 iBT) or IELTS score of 7.5 or greater. A student entering the Ph.D. program should have an M.S. in an engineering discipline. Special consideration may be given to exceptional students with a B.S. degree in engineering who may wish to bypass the M.S. in completing the requirements for the doctoral degree.	The student must have a 3.00 grade point average or higher and, if applicable, **a TOEFL iBT score of 96 or equivalent.** A student entering the Ph.D. program should have an M.S. in an engineering discipline. Special consideration may be given to exceptional students with a B.S. degree in engineering who may wish to bypass the M.S. in completing the requirements for the doctoral degree.
Provisional Admission	Provisional Admission
An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student shall be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship.	An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student shall be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship.
Contingent Admission	Contingent Admission
If a student applying to the M.S. program does not have an undergraduate degree in engineering or an approved C.S. degree, the student will be required to complete approximately 45-48 hours of prerequisite coursework in mathematics, the sciences, or engineering. The student will be granted contingent admission until the course requirement has been satisfied. If a student applying to the Ph.D. program does not have a B.S. or M.S. in engineering or C.S., the same set of 45-48 hours of courses will be required before the student is fully admitted.	If a student applying to the M.S. program does not have an undergraduate degree in engineering or an approved C.S. degree, the student will be required to complete approximately 45-48 hours of prerequisite coursework in mathematics, the sciences, or engineering. The student will be granted contingent admission until the course requirement has been satisfied. If a student applying to the Ph.D. program does not have a B.S. or M.S. in engineering or C.S., the same set of 45-48 hours of courses will be required before the student is fully admitted.

Graduate Committees	Graduate Committees
The graduate committee for each M.S. and Ph.D. student will be composed of a minimum of four and five faculty members, respectively. Faculty members on the graduate Biomedical Engineering faculty hold appointments in departments in the College of Engineering at MSU, the Department of Chemistry at MSU, the Department of Animal and Dairy Sciences at MSU, the College of Veterinary Medicine (CVM) at MSU, and in departments of the University of Mississippi Medical Center (UMMC) in Jackson, Mississippi.	The graduate committee for each M.S. and Ph.D. student will be composed of a minimum of four and five faculty members, respectively. Faculty members on the graduate Biomedical Engineering faculty hold appointments in departments in the College of Engineering at MSU, the Department of Chemistry at MSU, the Department of Animal and Dairy Sciences at MSU, the College of Veterinary Medicine (CVM) at MSU, and in departments of the University of Mississippi Medical Center (UMMC) in Jackson, Mississippi.
The following requirements for an M.S. graduate committee will apply:	The following requirements for an M.S. graduate committee will apply:
Chair must be an MSU engineering faculty member	**Chair and at least one other member must be from the Department of Agricultural & Biological Engineering**
One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)	**At least three members must hold a Graduate Faculty appointment**
Two or more members must be engineers	One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)
Two or more members must be MSU faculty members	
The following requirements for a Ph.D. graduate committee will apply:	The following requirements for a Ph.D. graduate committee will apply:
Chair must be an MSU engineering faculty member	**Chair and at least one other member must be from the Department of Agricultural & Biological Engineering**
One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)	**At least three members must hold a Graduate Faculty appointment**
Three or more members must be engineers	One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)
Three or more members must be MSU faculty members	
Academic Performance	Academic Performance
Unsatisfactory performance in the graduate program in Biomedical Engineering is defined as any of the following:	Unsatisfactory performance in the graduate program in Biomedical Engineering is defined as any of the following:
Failure to maintain a B average in attempted graduate courses after admission to the program	Failure to maintain a B average in attempted graduate courses after admission to the program
A grade of D or F in any course	A grade of D or F in any course
More than two grades below a B	More than two grades below a B
Failure of the qualifying or preliminary exam (Ph.D. students only)	Failure of the qualifying or preliminary exam (Ph.D. students only)
Failure of the thesis/dissertation defense	Failure of the thesis/dissertation defense

Unsatisfactory evaluation of a thesis or dissertation Receiving a second grade of U in ABE 8000 Research/Thesis or ABE 9000 Research/Dissertation (A student who receives a grade of U will be placed on academic probation the following semester. A second grade of U in ABE 8000/9000 in the probationary semester or any thereafter will result in dismissal from the program.) Any one of these or a combination of these will constitute the basis for review for possible dismissal. The graduate coordinator will review the record along with the student's graduate committee and take a final course of action which will be recommendation for immediate dismissal or the establishment of a probationary period in which corrective action must take place. Appeal of dismissal can be made by submitting a written appeal statement to the department head. If the dismissal is upheld by the department head upon the student's appeal, the student can then submit a written appeal to the dean of the College of Engineering.	Unsatisfactory evaluation of a thesis or dissertation Receiving a second grade of U in ABE 8000 Research/Thesis or ABE 9000 Research/Dissertation (A student who receives a grade of U will be placed on academic probation the following semester. A second grade of U in ABE 8000/9000 in the probationary semester or any thereafter will result in dismissal from the program.) Any one of these or a combination of these will constitute the basis for review for possible dismissal. The graduate coordinator will review the record along with the student's graduate committee and take a final course of action which will be recommendation for immediate dismissal or the establishment of a probationary period in which corrective action must take place. Appeal of dismissal can be made by submitting a written appeal statement to the department head. If the dismissal is upheld by the department head upon the student's appeal, the student can then submit a written appeal to the dean of the College of Engineering.

CURRENT CURRICULUM OUTLINE	Hours	**PROPOSED CURRICULUM OUTLINE**	Hours
		<u>Beyond the baccalaureate degree</u>	
ABE 8621 Methods of Biomedical Engineering Research	1	ABE 8621 Methods of Biomedical Engineering Research	1
ABE 8801 Clinical Experience for Biomedical Engineering	1	ABE 8801 Clinical Experience for Biomedical Engineering	1
BIO 6514 Animal Physiology or BIO 6114 Cellular Physiology	4	BIO 6514 Animal Physiology or BIO 6114 Cellular Physiology	4
ST 8114 Statistical Methods	4	ST 8114 Statistical Methods	4
8000-level or higher coursework	6	8000-level or higher coursework	6
MA XXXX Graduate-level mathematics course[1]	3	MA XXXX Graduate-level mathematics course[1]	3
Additional graduate-level coursework	29	Additional graduate-level coursework	29
Dissertation research/dissertation	20-32	Dissertation research/dissertation	20-32
Total Hours	80	Total Hours	80
[1] Or approved substitute, such as an additional graduate level statistics course.		**<u>Beyond the master's degree (any discipline of engineering)</u>**	
The Ph.D. degree requires that the student pass a qualifying exam, a preliminary exam, a dissertation defense, and a minimum of 48 coursework hours beyond the B.S., and 20-32 dissertation research		**ABE 8621 Methods of Biomedical Engineering Research** **ABE 8801 Clinical Experience for Biomedical Engineering**	1 1

		BIO 6514 Animal Physiology **or BIO 6114 Cellular Physiology** **ST 8114 Statistical Methods** **8000-level or higher coursework** **MA XXXX Graduate-level mathematics course[1]** **Additional graduate-level coursework** **Dissertation research/dissertation** **Total Hours** **A preliminary examination, a dissertation, and an oral examination in defense of the dissertation are required. Doctoral students are required to take or have credit in a graduate level math course, complete a minimum of 48 credit hours of coursework beyond the baccalaureate degree or a minimum of 24 credit hours of coursework beyond the master's degree, and complete 20-32 hours of dissertation research.**	4 4 6 3 5 20-32 56
Research/Dissertation	20-32	*Research/Dissertation*	20-32
Total Hours	80	**Minimum Total Hours**	**80 beyond B.S** **56 beyond M.S.**

3. Justification and Student Learning Outcomes

The proposed change will not impact student learning outcomes. It is intended to clarify the degree requirements for current and prospective students who have already earned a master's degree. Twenty-four is the standard GPA credit hour requirement for a Master of Science in engineering with a thesis requirement (total hours = 24 GPA + 6 research/thesis). Thus, the proposed total 24 GPA credit hour requirement beyond the master's degree is equivalent to the 48 GPA credit hour requirement beyond the bachelor's degree. These GPA credit hours are in addition to the required 6 and 20 credit hours of research/thesis/dissertation which are required for the M.S. and Ph.D., respectively.

a. Will this program change result in duplication in the System?

No. The proposed change is a very minor one to an existing program.

b. Will this program change/advance student diversity within the discipline?

   The proposed change is not expected to impact diversity of our graduate student population. We have always promoted participation by students from all national, racial, cultural, and ethnic backgrounds and will continue to do so.

c. Will this program change result in an increase in the potential placement of graduates in MS, the Southeast, and the U.S.?

   The proposed change does not alter the overall curriculum. We hope that it will encourage students with a master's degree to apply to the doctoral program.

d. Will the program change result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S.?

   The proposed change will not affect potential salaries.

4. Support (see letter attached)

5. Proposed 4-Letter Abbreviation: No change

6. Effective Date: June 2, 2022

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: Architecture, Art and Design **Department: School of Architecture**

Contact Person: Alexis Gregory **Mail Stop: 9633** **E-mail: ag1201@msstate.edu**
Nature of Change: Modification **Date Initiated: 11/22/21** **Effective Date: Fall 2022**
Current Degree Program Name: Bachelor of Architecture

Major: Architecture **Concentration: None**

New Degree Program Name: Bachelor of Architecture

Major: Architecture **Concentration: None**

Summary of Proposed Changes:

- **Change of name for ARC 2713 Passive Building Systems to ARC 2713 Environmental Building Systems I and change of name for ARC 3723 Active Building Systems to ARC 3723 Environmental Building Systems II.**
- **Program description change to more specifically outline requirements to progress into the 5th year of the 5-year Bachelor of Architecture program.**

Approved:	Date:
Department Head	30 Nov 2021
Chair, College or School Curriculum Committee	28 JANUARY 2022
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing undergraduate degree outline. If any General Education (Core) course is acceptable in the category, please indicate by saying "any Gen Ed course". There is no need to type in the whole list. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Include the course prefix, number, and title in both columns. Expand this table as needed.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Architecture Major: Architecture Concentration: None	Degree: Bachelor of Architecture Major: Architecture Concentration: None
The curriculum is divided into three levels: the first-year level is defined as the pre-professional program; the second and third year levels comprise the professional core; the fourth year comprises topical and capstone studios, and the fifth-year provides the transition to professional practice and includes a comprehensive capstone project. The first four years are at the main campus of MSU in Starkville; the fifth year is at the Stuart C. Irby Studios at the Jackson Center in downtown Jackson, MS. The curriculum is composed of four areas of study representing: (1) Design, (2) History/Theory, (3) Technology, (4) Professional Practice 1. Design - concerned with the understanding of form, shape, and space responsive to human needs and programs, together with development of architectural communication skills and ecological thinking. 2. History/Theory - composed of architectural history and philosophy, current architectural ideas, and future implications. 3. Technology - providing basic knowledge in physical systems of structures, materials, construction, sustainability, and service systems of plumbing, electrical, heating, and air conditioning. 4. Professional Practice - representing the tools necessary to direct the processes of architecture, integrated project delivery, areas of economics, real estate, finance, land use, law, and office practice. Located at the Jackson Center in downtown Jackson, the fifth-year offers the student the opportunity to develop depth and expertise through research and design projects focused on urban issues. The city provides a major resource for the activities and a laboratory for continued study. Professionals involved in all areas of the built environment contribute to the teaching. This experience provides a transition from the academic foundation to the professional realities of architecture.	The curriculum is divided into three levels: the first-year level is defined as the pre-professional program; the second and third year levels comprise the professional core; the fourth year comprises topical and capstone studios, and the fifth-year provides the transition to professional practice and includes a comprehensive capstone project. The first four years are at the main campus of MSU in Starkville; the fifth year is at the Stuart C. Irby Studios at the Jackson Center in downtown Jackson, MS. **Students cannot progress to the fifth year until all undergraduate courses (1000-4000-level taken during the first four years of the program) have been satisfactorily completed.** The curriculum is composed of four areas of study representing: (1) Design, (2) History/Theory, (3) Technology, (4) Professional Practice 1. Design - concerned with the understanding of form, shape, and space responsive to human needs and programs, together with development of architectural communication skills and ecological thinking. 2. History/Theory - composed of architectural history and philosophy, current architectural ideas, and future implications. 3. Technology - providing basic knowledge in physical systems of structures, materials, construction, sustainability, and service systems of plumbing, electrical, heating, and air conditioning. 4. Professional Practice - representing the tools necessary to direct the processes of architecture, integrated project delivery, areas of economics, real estate, finance, land use, law, and office practice. Located at the Jackson Center in downtown Jackson, the fifth-year offers the student the opportunity to develop depth and expertise through research and design projects focused on urban issues. The city provides a major resource for the activities and a laboratory for continued study. Professionals involved in all areas of the built

		environment contribute to the teaching. This experience provides a transition from the academic foundation to the professional realities of architecture.	
"[Click here and type old concentration description]" NONE		"[Click here and type old concentration description]" NONE	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English Composition I EN 1103 or Accelerated Composition I EN 1163	3	English Composition I EN 1103 or Accelerated Composition I EN 1163	3
English Composition II EN 1113 or Accelerated Composition II EN 1173	3	English Composition II EN 1113 or Accelerated Composition II EN 1173	3
Fine Arts (General Education): any Gen Ed course	3	Fine Arts (General Education): any Gen Ed course	3
General Physics I PH 1113 General Physics II PH 1123 *Passive Building Systems ARC 2713*	3 3 *3*	General Physics I PH 1113 General Physics II PH 1123 **Environmental Building Systems I ARC 2713[1]**	3 3 **3[1]**
College Algebra MA 1313 Trigonometry MA 1323 Calculus for Business and Life Sciences I MA 1613	*3* *3* 3	College Algebra MA 1313[2] Trigonometry MA 1323[2] Calculus for Business and Life Sciences I MA 1613	 3
History of Architecture I ARC 2313 History of Architecture II ARC 3313	3 3	History of Architecture I ARC 2313[3] History of Architecture II ARC 3313[3]	3[3] 3[3]
Social/Behavioral Sciences (Gen Ed): any Gen Ed course	6	Social/Behavioral Sciences (Gen Ed): any Gen Ed course	6
Approved Electives	12	Approved Electives	12
Architectural Design I-A ARC 1536	6	Architectural Design I-A ARC 1536	6
Architectural Design I-B ARC 1546	6	Architectural Design I-B ARC 1546	6
Architectural Design II-A ARC 2536	6	Architectural Design II-A ARC 2536	6
Architectural Design II-B ARC 2546	6	Architectural Design II-B ARC 2546	6
Architectural Design III-A ARC 3536	6	Architectural Design III-A ARC 3536	6
Architectural Design III-B ARC 3546	6	Architectural Design III-B ARC 3546	6
Architectural Design IV-A ARC 4536	6	Architectural Design IV-A ARC 4536	6
Architectural Design IV-B ARC 4546	6	Architectural Design IV-B ARC 4546	6
Architectural Design V-A ARC 5576	6	Architectural Design V-A ARC 5576	6
Architectural Design V-B ARC 5589	9	Architectural Design V-B ARC 5589	9
Drawing I ART 1213	3	Drawing I ART 1213	3
Drawing II ART 2313	*3*	Drawing II ART 2313[4]	
History of Architecture I ARC 2313	*3*	History of Architecture I ARC 2313[3]	
History of Architecture II ARC 3313	*3*	History of Architecture II ARC 3313[3]	
History of Architecture III ARC 3323	3	History of Architecture III ARC 3323	3
Architectural Theory ARC 4313	3	Architectural Theory ARC 4313	3
Passive Building Systems ARC 2713	*3*	**Environmental Building Systems I ARC**	
Active Building Systems ARC 3723	*3*	**2713[1]**	
Materials ARC 2723	3	**Environmental Building Systems II ARC**	**3**
Assemblages ARC 3713	3	**3723**	
Architectural Structures I ARC 3904	4	Materials ARC 2723	3
Structures II ARC 3914	4	Assemblages ARC 3713	3
Site Planning for Architects ARC 4733	3	Architectural Structures I ARC 3904	4
Legal Aspects for Architecture ARC 5383	3	Structures II ARC 3914	4
Architectural Programming ARC 5443	3	Site Planning for Architects ARC 4733	3
Architectural Practice ARC 5493	3	Legal Aspects for Architecture ARC 5383	3
Philosophy of Architecture ARC 5353	3	Architectural Programming ARC 5443	3

Theory of Urban Design ARC 5623	3	Architectural Practice ARC 5493 Philosophy of Architecture ARC 5353 Theory of Urban Design ARC 5623	3 3 3
Concentration Courses NONE	0	Concentration Courses NONE	0
Total Hours	152	Total Hours	152

[1] Counted as both Science requirement and Major Core.

[2] MA 1313 College Algebra and MA 1323 Trigonometry should be completed prior to beginning studies in architecture. Students may satisfy math prerequisite requirements of MA 1313 College Algebra with a 24 ACT Math score. Students may also take the College Level Examination Program (CLEP) exam to place out of MA 1313. Students with a 26 ACT Math score may satisfy the prerequisite of PH 1113 General Physics I.

[3] Counted as both Humanities requirement and Major Core.

[4] ART 1223 Drawing II is required of all students receiving a grade of "C" or less in ART 1213 Drawing I.

Justification:

- Change of name for ARC 2713 Passive Building Systems to ARC 2713 Environmental Building Systems I and change of name for ARC 3723 Active Building Systems to ARC 3723 Environmental Building Systems II.
    - The current course names are not reflective of the collaborative nature of the active and passive systems in architecture. The new names are intended to reflect the relationship between the two courses as both being environmental building systems.
- Students are unclear that they cannot take 1000-4000 level courses when they move to Jackson to complete the 5th year of the 5-year Bachelor of Architecture program. This additional language is to make clear this requirement.

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF ARCHITECTURE, ART AND DESIGN
School of Architecture
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caad.msstate.edu

November 19, 2021

Director Karen Spence
School of Architecture
P.O. Box AQ
Mississippi State, MS 39762

Director Spence,

The School of Architecture Curriculum Committee unanimously agrees and supports the course modifications for the following:

- Name change for ARC 2713 Passive Building Systems and BCS 2713 Passive Building Systems to ARC 2713 Environmental Building Systems I and BCS 2713 Environmental Building Systems I
- Name change for ARC 3723 Active Building Systems and BCS 3723 Active Building Systems to ARC 3723 Environmental Building Systems II and BCS 3723 Environmental Building Systems II

The Committee feels these changes will improve the education of our students while supporting their chances for success in the program. We are available to answer any questions you have regarding the program changes.

Sincerely,

Alexis Gregory
Chair, Curriculum Committee
Associate Professor

Silvina Lopez Barrera
Vice Chair, Curriculum Committee
Assistant Professor

Jassen Callender
Professor

Chris Hunter
Assistant Professor

Jacob Gines
Associate Professor

Duane McLemore
Assistant Professor

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: Architecture, Art and Design **Department: Building Construction Science Program**

Contact Person: Saeed Rokooei **Mail Stop: 9635** **E-mail: sr1971@msstate.edu**
Nature of Change: Modification **Date Initiated: 11/22/21** **Effective Date: Fall 2022**
Current Degree Program Name: Bachelor of Science

Major: Building Construction Science **Concentration: None**

New Degree Program Name: Bachelor of Science

Major: Building Construction Science **Concentration: None**

Summary of Proposed Changes:

- **Change of name for BCS 2713 Passive Building Systems to BCS 2713 Environmental Building Systems I and change of name for BCS 3723 Active Building Systems to BCS 3723 Environmental Building Systems II.**

Approved:	Date:
Department Head	1/28/22
Chair, College or School Curriculum Committee	28 JANUARY 2022
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing undergraduate degree outline. If any General Education (Core) course is acceptable in the category, please indicate by saying "any Gen Ed course". There is no need to type in the whole list. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Include the course prefix, number, and title in both columns. Expand this table as needed.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Building Construction Science Concentration: None	Degree: Bachelor of Science Major: Building Construction Science Concentration: None
The Building Construction Science degree program is a four year Bachelor of Science degree designed to prepare graduates for careers in construction or construction-related fields. The 124 credit hour program is an interdisciplinary curriculum that builds upon expertise existing within the School of Architecture and the College of Engineering and the College of Business as well as the building construction industry to provide a knowledge base in business, engineering, and construction sciences. The curriculum's foundational areas are based on a problem-and inquiry-based learning. Through the four year studio curriculum, students learn by applying skills and knowledge to complex construction problems that integrate multiple subject areas. The studio-based teaching focuses on the use of case studies and integration of multiple subject areas. This integration of a broader scope of architectural, engineering, construction, and business practices is a different approach than a traditional construction technology curriculum that separates subject areas into distinct courses. The Building Construction Science curriculum includes a general education foundation of mathematics, science, business, and construction specific courses: construction systems, building technology, structures, and materials and methods of construction and incorporates these and other areas such as estimating, scheduling, safety, project management, and construction law into the studio curriculum. Course development is built upon the strengths of the three colleges that are collaborating in the effort. Building Construction Science students collaborate with architecture, engineering, and interior design students as a regular part of their course work. The Building Construction Science program is accredited by the American Council for Construction Education (ACCE).	The Building Construction Science degree program is a four year Bachelor of Science degree designed to prepare graduates for careers in construction or construction-related fields. The 124 credit hour program is an interdisciplinary curriculum that builds upon expertise existing within the School of Architecture and the College of Engineering and the College of Business as well as the building construction industry to provide a knowledge base in business, engineering, and construction sciences. The curriculum's foundational areas are based on a problem-and inquiry-based learning. Through the four year studio curriculum, students learn by applying skills and knowledge to complex construction problems that integrate multiple subject areas. The studio-based teaching focuses on the use of case studies and integration of multiple subject areas. This integration of a broader scope of architectural, engineering, construction, and business practices is a different approach than a traditional construction technology curriculum that separates subject areas into distinct courses. The Building Construction Science curriculum includes a general education foundation of mathematics, science, business, and construction specific courses: construction systems, building technology, structures, and materials and methods of construction and incorporates these and other areas such as estimating, scheduling, safety, project management, and construction law into the studio curriculum. Course development is built upon the strengths of the three colleges that are collaborating in the effort. Building Construction Science students collaborate with architecture, engineering, and interior design students as a regular part of their course work. The Building Construction Science program is accredited by the American Council for Construction Education (ACCE).
"[Click here and type old concentration description]" NONE	"[Click here and type old concentration description]" NONE

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English Composition I EN 1103 or Expanded English Composition I EN 1104	3	English Composition I EN 1103 or Expanded English Composition I EN 1104	3

English Composition II EN 1113 or Accelerated Composition II EN 1173	3	English Composition II EN 1113 or Accelerated Composition II EN 1173	3
Fine Arts Architectural Appreciation ARC 1013	3	Fine Arts Architectural Appreciation ARC 1013	3
General Physics I PH 1113 General Physics II PH 1123 *Passive Building Systems BCS 2713*	3 3 *3*	General Physics I PH 1113 General Physics II PH 1123 **Environmental Building Systems I BCS 2713**	3 3 **3**
Calculus for Business and Life Sciences I MA 1613 Introduction to Statistics ST 2113	3 3	Calculus for Business and Life Sciences I MA 1613 Introduction to Statistics ST 2113	3 3
Humanities (Gen Ed): any Gen Ed course	6	Humanities (Gen Ed): any Gen Ed course	6
Principles of Macroeconomics EC 2113 Principles of Microeconomics EC 2123	3 3	Principles of Macroeconomics EC 2113 Principles of Microeconomics EC 2123	3 3
Approved Electives	3	Approved Electives	3
Surveying CE 2213 Virtual Design and Construction BCS 2313 *Active Building Systems BCS 3723* Structures I BCS 3904 Structures II BCS 3914 Building Construction Studio A BCS 1116 Building Construction Studio B BCS 1126 Building Construction Studio 1 BCS 2116 Or Construction Internship/Co-op BCS 3006 Building Construction Studio 2 BCS 2226 Building Construction Studio 3 BCS 3116 Building Construction Studio 4 BCS 3126 Or Construction Internship/Co-op BCS 3006 Building Construction Studio 5 BCS 4116 Building Construction Studio 6 BCS 4126 Mechanical and Electrical Systems BCS 3213 High Performance Construction BCS 3323 Professional Communication and Practice BCS 4222 Principles of Financial Accounting ACC 2013 Principles of Managerial Accounting ACC 2023 The Legal Environment of Business BL 2413 Principles of Management MGT 3113	3 3 *3* 4 4 6 6 6 6 6 6 6 6 3 3 2 3 3 3 3	Surveying CE 2213 Virtual Design and Construction BCS 2313 **Environmental Building Systems II BCS 3723** Structures I BCS 3904 Structures II BCS 3914 Building Construction Studio A BCS 1116 Building Construction Studio B BCS 1126 Building Construction Studio 1 BCS 2116 Or Construction Internship/Co-op BCS 3006 Building Construction Studio 2 BCS 2226 Building Construction Studio 3 BCS 3116 Building Construction Studio 4 BCS 3126 Or Construction Internship/Co-op BCS 3006 Building Construction Studio 5 BCS 4116 Building Construction Studio 6 BCS 4126 Mechanical and Electrical Systems BCS 3213 High Performance Construction BCS 3323 Professional Communication and Practice BCS 4222 Principles of Financial Accounting ACC 2013 Principles of Managerial Accounting ACC 2023 The Legal Environment of Business BL 2413 Principles of Management MGT 3113	3 3 **3** 4 4 6 6 6 6 6 6 6 6 3 3 2 3 3 3 3
Concentration Courses		Concentration Courses	
Total Hours	124	Total Hours	124

Justification:

- Change of name for BCS 2713 Passive Building Systems to BCS 2713 Environmental Building Systems I and

change of name for BCS 3723 Active Building Systems to BCS 3723 Environmental Building Systems II.

- The current course names are not reflective of the collaborative nature of the active and passive systems in architecture. The new names are intended to reflect the relationship between the two courses as both being environmental building systems.

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF ARCHITECTURE, ART AND DESIGN
Building Construction Science Program
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November 19, 2021

To: University Committee on Courses and Curricula

Re: Approval for BCS Courses Name Change

The Building Construction Science Curriculum Committee has voted to approve the following modifications to the BCS courses:

- Name change for ARC 2713 Passive Building Systems and BCS 2713 Passive Building Systems to ARC 2713 Environmental Building Systems I and BCS 2713 Environmental Building Systems I.
- Name change for ARC 3723 Active Building Systems and BCS 3723 Active Building Systems to ARC 3723 Environmental Building Systems II and BCS 3723 Environmental Building Systems II.

Name/Title	Committee Role	Signature
Michele Herrmann, Associate Professor	Voting Member	
Saeed Rokooei, Assistant Professor	Committee Chair, Voting Member	
Afshin Hatami Assistant Professor	Voting Member	
Lee Carson, Assistant Clinical Professor	Voting Member	
Mohsen Garshasby Assistant Professor	Voting Member	

Please feel free to contact me with any questions or concerns.

Sincerely,

Saeed Rokooei
Assistant Professor
Building Construction Science Curriculum Committee Chair

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: Education Department: Educational Leadership

Contact Person: Dr. Myron Labat Jr. Mail Stop: 9698 E-mail: mlabat@colled.msstate.edu

Nature of Change: A Change in Name Only Date Initiated: December 15, 2021
Effective Date: Summer 2022

Current Degree Program Name: Doctor of Education

Major: Education Concentration: Educational Leadership

New Degree Program Name:

Major: Education Concentration: P-12 School Leadership

Summary of Proposed Changes: This is a concentration name change. No changes are being made to the program of study. Instead, it is to correct the error of listing the concentration as "Educational Leadership" instead of "P-12 School Leadership."

Approved:	Date:
Department Head	3/2/2022
Chair, College or School Curriculum Committee	March 10, 2022
Dean of College or School	03.10.2022
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

GRADUATE DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing Graduate Degree. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Please include the course prefix, number, and title in both columns. Expand rows as needed.

CURRENT Degree Description		PROPOSED Degree Description	
Degree: Doctor of Education (Ed.D.) Major: Education Concentrations: *Educational Leadership*		Degree: Doctor of Education (Ed.D.) Major: Education Concentrations: **P-12 School Leadership**	
The Doctor of Education (Ed.D.) program offers a terminal degree designed to prepare scholar-practitioners serving in P-12 leadership positions. By combining educational theory with action research, students learn how to critically examine problems and provide solutions to needs at the building and district levels. Graduates will possess the content knowledge and research skills to improve schools in the P-12 educational system.		The Doctor of Education (Ed.D.) program offers a terminal degree designed to prepare scholar-practitioners serving in P-12 leadership positions. By combining educational theory with action research, students learn how to critically examine problems and provide solutions to needs at the building and district levels. Graduates will possess the content knowledge and research skills to improve schools in the P-12 educational system.	
The *Educational Leadership* concentration is designed to prepare educators in the P-12 School Leadership arena for leadership at the building and district levels.		The **P-12 School Leadership** concentration is designed to prepare educators in the P-12 School Leadership arena for leadership at the building and district levels.	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
College Required Courses None		College Required Courses None	
Major Required Courses EDA 8163 Public School Finance EDA 8223 Seminar in Administration EDA 8423 Law and Ethics in Educational Leadership EDA 8433 The Superintendency EDA 8443 Politics and Policy in Educational Leadership EDA 8453 Instructional Leadership EDA 8463 Technology and Communication in Educational Leadership EDA 8283 Educational Leadership EDA 8353 Applications of Theory to Educational Administration EDA 8413 Human Resources Administration in Educational Leadership EDA Elective 1 EDA Elective 2	- 3 3 3 3 3 3 3 3 3 3 3 3	Major Required Courses EDA 8163 Public School Finance EDA 8223 Seminar in Administration EDA 8423 Law and Ethics in Educational Leadership EDA 8433 The Superintendency EDA 8443 Politics and Policy in Educational Leadership EDA 8453 Instructional Leadership EDA 8463 Technology and Communication in Educational Leadership EDA 8283 Educational Leadership EDA 8353 Applications of Theory to Educational Administration EDA 8413 Human Resources Administration in Educational Leadership EDA Elective 1 EDA Elective 2	- 3 3 3 3 3 3 3 3 3 3 3 3
Concentration 1. Courses EDA 8473 Introduction to Research in Educational Leadership EDA 8493 Action Research EDA 8483 Survey Research EDA 8563 Program Evaluation EDA 8623 Doctoral Capstone 1 EDA 8633 Doctoral Capstone 2 EDA 8643 Doctoral Capstone 3	- 3 3 3 3 3 3 3	Concentration 1. Courses EDA 8473 Introduction to Research in Educational Leadership EDA 8493 Action Research EDA 8483 Survey Research EDA 8563 Program Evaluation EDA 8623 Doctoral Capstone 1 EDA 8633 Doctoral Capstone 2 EDA 8643 Doctoral Capstone 3	- 3 3 3 3 3 3 3
Concentration 2. Courses None		Concentration 2. Courses None	
Total Hours	57	Total Hours	57

JUSTIFICATION FOR CURRENT PROPOSAL (SUBMITTED AS A FOLLOW-UP TO A PROPOSAL APPROVED IN 2021)

This proposal addresses a name change for a previously approved concentration under the Ed.D. in Education due to a technical error identified at the end of the proposal process.

The Ed.D. in Education with a concentration in Educational Leadership was fully approved by the UCCC in 2021. However, when IHL attempted to code the degree into their system, they found that "Educational Leadership" was not an option for the concentration title. To fix the problem, the Department of Educational Leadership was instructed to submit a subsequent request to change the concentration from Educational Leadership to P-12 School Leadership, a concentration title that already exists in the system. No changes have been made to the previously approved program or courses.

JUSTIFICATION AND LEARNING OUTCOMES FOR THE ORIGINAL PROPOLSAL (APPROVED IN 2021)

In an effort to better meet the needs of P-12 School Leadership students pursuing doctorate degrees in Educational Leadership we are proposing these modifications to the Doctor of Education (Ed.D.) degree in Educational Leadership. The modifications being proposed to the Ed.D. Program are requested to place the needs of P-12 doctoral students at the forefront. The overwhelming majority of our doctoral graduates pursue doctoral degrees in order to increase their qualifications for upper leadership positions at the school and district P-12 levels. These students also pursue doctoral degrees to increase their knowledgebase positioning them to be more effective P-12 school leaders. Traditionally, there has been a disconnect in research training for P-12 school leaders pursuing doctorate level education. Although the overwhelming majority of our doctoral candidates intend to remain as leaders in the P-12 setting, the research training offered in the Ph.D. Program and in our current Ed.D. Program is tailored more towards traditional theoretical research rather than applied research which is much more appropriate and applicable to the work that they do in the P-12 setting. Lastly, there is a sweeping trend in the P-12 Educational Leadership Field within the state of Mississippi and beyond which has resulted in more and more P-12 Educational Leadership Programs implementing Ed.D. Programs with a more applied research focus. Most of these programs require a capstone project or an applied research project as the culminating project rather than a traditional dissertation. These field-based capstone projects are designed to address a specific problem within their school or school district. This is what many P-12 Leaders are looking for when they pursue a doctoral program. In order to remain competitive with other doctoral programs within our state and within our region it is important that we are able to offer a similar program experience for potential and current students looking to advance their careers and knowledgebase.

Learning Outcomes

Students will develop the skills and knowledge needed to engage in meaningful action research.

Students will learn and explore the legal and ethical implications as they relate to addressing action research.

Students will acquire the requisite knowledge needed to develop appropriate survey and sampling techniques to support their research.

Students will learn the principles of program evaluation as applied to educational problems of practice.

Students will learn the fundamental of investigating problems of practice and proposing solutions to address those problems.

Students will learn the fundamentals of data collection and analysis.

Students will develop research skills and knowledge appropriate for scholar practitioners.

Students will develop a deeper knowledge of the school leader's role in instructional leadership by promoting the effective instructional practices that will advance student achievement.

Students will be prepared to utilize the principles of human resources management from the perspective of an advanced educational leader.

Students will explore many of the critical elements of politics and policy impacting the field of educational leadership.

Students will gain a greater understanding of the complexities and responsibilities associated with the position of school superintendent.

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF EDUCATION
Department of Educational Leadership

P.O. Box 6037
245 Allen Hall
175 President's Circle
Mississippi State, MS 39762

P. 662.325.0969
F. 662.325.0975
educ.msstate.edu

TO: UCCC

FROM: Myron Labat Jr., Educational Leadership Department Head

RE: Support for change of concentration to the Ed.D. program

DATE: November 1, 2021

This letter of support is offered by the P-12 Leadership faculty in the Department of Educational Leadership for a proposed change in the "concentration" of the Ed.D. The current program is listed with a major in "Education" with a concentration in "Educational Leadership." A concentration in "Educational Leadership" does not exist, so the Correct concentration area should be "P-12 School Leadership." As indicated by the signatures below, the program area faculty support the proposal as written for submission to the UCCC. Program Area Faculty:

[Signature of approving faculty member 1]	11/8/21 [Date]
[Signature of approving faculty member 2]	11/15/21 [Date]
[Signature of approving faculty member 3]	11/17/21 [Date]
[Signature of approving faculty member 4]	11/30/21 [Date]
[Signature of approving faculty member 5]	11/30/21 [Date]

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: College of Education Department: Counseling, Educational Psychology, and Foundations

Contact Person: Joan Looby Mail Stop: 9727 E-mail: jlooby@colled.msstate.edu
Nature of Change: Program Modification
Date Initiated: 1/27/2022 Effective Date: Fall 2022

Current Degree Program Name: Doctor of Philosophy

Major: Counselor Education & PhD Student Counseling & Guidance Concentration:

New Degree Program Name: Doctor of Philosophy

Major: Counselor Education & PhD Student Counseling & Guidance Concentration:

Summary of Proposed Changes: The changes are in response to CACREP accrediting body requirements. The first change involves the addition of two doctoral courses-COE 9063-Leadership and Advocacy in Counseling, and COE 9073-Teaching in Counseling. The second change includes the addition of two research courses designed to increase student expertise in a variety of research methodologies utilized in counseling. The third change includes adding a six hour internship course for dual enrolled students who have limited counseling experience or are not licensed. The total minimum required hours will increase from 81 to 84-90. The faculty believe that doctoral students will benefit from these changes as they will expand their knowledge of the field, develop increased clinical expertise, and will become more marketable because of this comprehensive training. Additionally, some accompanying language in the degree description area has been updated.

Approved: _____	Date: 2/2/2022
Department Head	
_____	2/25/2022
Chair, College or School Curriculum Committee	
_____	_____
Dean of College or School	
_____	_____
Chair, University Committee on Courses and Curricula	
_____	_____
Chair, Graduate Council (if applicable)	
_____	_____
Chair, Deans Council	

GRADUATE DEGREE MODIFICATION OUTLINE FORM

CURRENT Degree Description	PROPOSED Degree Description
Degree: Doctor of Philosophy Major: Counselor Education & PhD Student Counseling & Guidance Concentrations:	Degree: Doctor of Philosophy Major: Counselor Education & PhD Student Counseling & Guidance Concentrations:
The Department of Counseling, Educational Psychology, and Foundations offers graduate programs in clinical mental health counseling, rehabilitation counseling, and school counseling. The Master of Science degree programs in clinical mental health counseling, rehabilitation counseling, and school counseling are planned programs consisting of 60 semester hours. The concentration in rehabilitation counseling prepares graduates for certification as a Certified Rehabilitation Counselor in all fifty states, as well as a Licensed Professional Counselor (LPC) in the state of Mississippi. Counseling doctoral applications are due February 1. Applications for master's and educational specialist programs are due March 1. Applications will be considered until full enrollment is attained. *Applications may be reviewed at other times for general educational psychology*. For further information, write to the Graduate Coordinator. The department prepares students for careers as school counselors, *student affairs professionals in higher education*, and as counselors in rehabilitation, college counseling centers, and other mental health community agencies. Teaching and research assistantships are available. Counseling Program Accreditations: The M.S. programs in Counseling are Clinical Mental Health, Rehabilitation, and School and are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). *The doctoral programs in counseling (PHCE) and in* school counseling (PHSE) are also accredited CACREP. The school counseling program is also accredited by the National Council for Accreditation of Teacher Education (NCATE). Graduate study in counseling offers preparation in counseling at three degree levels. 1. The Master of Science (M.S.) degree in Counselor Education with concentrations in clinical mental health counseling: rehabilitation counseling; *student affairs*;	The Department of Counseling, Educational Psychology, and Foundations offers graduate programs in clinical mental health counseling, rehabilitation counseling, and school counseling. The Master of Science degree programs in clinical mental health counseling, rehabilitation counseling, and school counseling are planned programs consisting of 60 semester hours. The concentration in rehabilitation counseling prepares graduates for certification as a Certified Rehabilitation Counselor in all fifty states, as well as a Licensed Professional Counselor (LPC) in the state of Mississippi. Counseling doctoral applications are due February 1. Applications for master's and educational specialist programs are due March 1. Applications will be considered until full enrollment is attained. For further information, write to the Graduate Coordinator. **The department prepares students for careers as school counselors, and as counselors in rehabilitation, college counseling centers, and other mental health community agencies**. Teaching and research assistantships are available. Counseling Program Accreditations: The M.S. programs in Counseling are Clinical Mental Health, Rehabilitation, and School and are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). **The doctoral programs in counseling (COED) and in** school counseling (PHSE) are also accredited CACREP. The school counseling program is also accredited by the National Council for Accreditation of Teacher Education (NCATE). Graduate study in counseling offers preparation in counseling at three degree levels. 1. The Master of Science (M.S.) degree in Counselor Education **with concentrations in clinical mental health counseling; rehabilitation counseling; and school counseling** 2. The Educational Specialist (Ed.S.) degree in Education with concentrations in counseling **and**

college counseling; and school counseling
2. The Educational Specialist (Ed.S.) degree in Education with concentrations in counseling *and school psychology* provide advanced coursework sought by students seeking licensure or higher levels of certification
3. The Doctor of Philosophy (Ph.D.) degree with two majors: Counselor Education and Student Counseling & Guidance

Admission Criteria for Counseling Programs

Applications for master's and educational specialist programs are due by March 1. Counseling doctoral applications are due by February 1. Applications will be considered until full enrollment is attained. *Applications may be reviewed at other times for general educational psychology.* For further information, write to the Graduate Coordinator.

A student accepted into the M.S. degree program in counseling must hold a baccalaureate degree and a minimum GPA of 3.00 on the last 60 hours of undergraduate work. *Satisfactory Graduate Record Examination (GRE) scores (verbal, quantitative, and analytic writing) taken within the past five years must be submitted.*

A student accepted into the Ed.S. degree program with a concentration in counseling must hold a master's degree in counseling or related field (as determined by program concentration*), a minimum GPA of 3.30 on all graduate work, and satisfactory GRE scores (verbal, quantitative, and analytical writing).*

A student accepted into a Ph.D. program must hold a master's degree from a CACREP- or CORE-accredited program in counseling or meet CACREP curriculum requirements as part of the doctoral program of study. *Satisfactory results of the Graduate record Examination (GRE) taken with the past five years must be submitted.*

Applicants for all counseling degree programs must also produce all other application requirements detailed by the Graduate School (e.g., letters of recommendation, statement of purpose).

Students admitted to a counseling program must maintain continuous enrollment. A student who is not enrolled or is inactive for one calendar year must be re-screened for readmission into the department prior to re-enrollment in the University (see the Readmission section under General Requirements for Admission in this publication).

school counseling provide advanced coursework sought by students seeking licensure or higher levels of certification
3. The Doctor of Philosophy (Ph.D.) degree with two majors: Counselor Education and Student Counseling & Guidance

Admission Criteria for Counseling Programs

Applications for master's and educational specialist programs are due by March 1. Counseling doctoral applications are due by February 1. Applications will be considered until full enrollment is attained. For further information, write to the Graduate Coordinator.

A student accepted into the M.S. degree program in counseling must hold a baccalaureate degree and a minimum GPA of 3.00 on the last 60 hours of undergraduate work. **Satisfactory Graduate Record Examination (GRE) scores (verbal, quantitative, and analytic writing) may be submitted but are not required**.

A student accepted into the Ed.S. degree program with a concentration in counseling must hold a master's degree in counseling or related field (as determined by program concentration**), and a minimum GPA of 3.30 on all graduate work.**

A student accepted into a Ph.D. program must hold a master's degree from a CACREP- or CORE-accredited program in counseling or meet CACREP curriculum requirements as part of the doctoral program of study. **Satisfactory results of the Graduate Record Examination (GRE) taken with the past five years may be submitted but are not required.**

Applicants for all counseling degree programs must also produce all other application requirements detailed by the Graduate School (e.g., letters of recommendation, statement of purpose).

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Provisional Admission for Counseling Programs

An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is

Provisional Admission for Counseling Programs

An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular admission status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). These graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student shall be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship.

Satisfactory Academic Performance

In addition to the requirements of Mississippi State University for graduate students, a student in any of the counseling programs is required to earn a grade of B or better in each skills course before being permitted to progress to the next course in the sequence. These "gatekeeper" courses include:

COE 8023	Counseling Theory	3
COE 8013	Counseling Skills Development	3
COE 8053	Practicum	3
COE 8633	Psychosocial Rehabilitation (CMHC only)	3
COE 8150	Academic School Year Field Experience Practicum	1-9
COE 8730	Internship	6

Unsatisfactory performance in graduate-level coursework is defined as a grade of U, D, or F in any course and/or more than two grades below a B after admission to the program. The grade of C, while not considered a failing grade, is seen as indicative of minimal academic performance. Only two grades of C are allowed during a student's work on a degree. Unsatisfactory performance also includes failing the master's comprehensive examination twice, failing the written doctoral preliminary/comprehensive examination twice, failing the oral doctoral

eligible for a change to regular admission status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). These graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student shall be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship.

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CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
College Required Courses		College Required Courses	
Major Required Courses		Major Required Courses	
Doctor of Philosophy in Counselor Education & Doctor of Philosophy in Student Counseling and Guidance		Doctor of Philosophy in Counselor Education & Doctor of Philosophy in Student Counseling and Guidance	
Prerequisites and Core Courses:		Prerequisite Coursework in addition to	
COE 8063 Research Techniques for Counselors	3	CACREP Master's Requirements (60 hours):	
EPY 8214 Intermediate Educational and Psychological Statistics	4	**EPY 6214 Educational and Psychological Statistics (or equivalent statistics course)**	4
EPY 9213 Multivariate Analysis in Educational Research	3	COE 8063 Research Techniques for Counselors (met in master's Program)	3
EPY 9263 Applied Research Seminar	3		
HED 8133 Curriculum and Instruction in Higher Education	3		
COE 9013 Counseling Supervision	3		
COE 9023 Advanced Counseling Theory	3	Research Core (16 hours) :	
COE 9033 Advanced Seminar	3	EPY 8214 Intermediate Educational and Psychological Statistics	4
COE 9043 Advanced Group Work and Systems	3	**EPY 8513 Psychometric Theory**	3
COE 9053 Advanced Multicultural Counseling	3	EPY 9213 Multivariate Analysis in Educational Research	3
COE 9083 Advanced Assessment Techniques for Counseling	3	**EDF 9373 Educational Research Design**	3
COE 9000 Dissertation Research	20	EDF 9453 Introduction to Qualitative Research in Education	3
COE 9740 Advanced Doctoral Practicum (300 clock hours)	3		
		Counseling Core (21-27 hours):	
COE 9750 Internship (600 clock hours)	6	COE 9013 Counseling Supervision	3
		COE 9023 Advanced Counseling Theory	3
Select one of the Following:		**COE 9063 Leadership and Advocacy in Counseling**	3
EDF 9443 Single-Subject Research Designs for Education	3	**COE 9073 Teaching in Counseling**	3
EDF 9453 Introduction to Qualitative Research	3	COE 9740 Advanced Doctoral Practicum (300 clock hours)	3
HI 8923 Historiography and Historical Methods	3	COE 9750 Internship I (600 clock hours)	6
		COE 9750 Internship II (600 clock hours; additional internship required for non-LPC students)	6
Approved Electives:	3-15		
Ph.D. students may also complete 12-18 hours in a minor area which would be considered elective hours.	12-18	Dissertation Hours (20 hours):	
		COE 9000 Research/Dissertation in Counselor Education & Educational Psychology	20
For additional information about the Ph.D. degree in counseling and in school counseling, see the departmental handbook.		Approved Electives (15 hours):	
		COE 9033 Advanced Seminar	3
		COE 9043 Advanced Group Work and Systems	3
		COE 9053 Advanced Multicultural	3

		Counseling COE 9083 Advanced Assessment Techniques for Counseling EDF 9443 Single Subject Research Designs for Education Minor/Focus Area (12 hours) : Ph.D. students can choose either a minor, focus area, or 12 additional hours of coursework. For additional information about the Ph.D. degree in counseling and in school counseling, see the departmental handbook.	3 3 12
Total Hours	81	Total Hours	**84-90**

3. Justification and Student Learning Outcomes

The first justification is to add two courses- COE 9063-Leadership and Advocacy in Counseling and COE 9073-Teaching in Counseling – as required by the academic area's accrediting body-CACREP. A teaching/college instruction course originally taught by a departmental faculty member was transferred to another department because the faculty member left the university. Counseling faculty had limited control over the course content and students reported little relevance and application of the course materials to counseling; thereby, the development of the teaching in counseling course. The leadership and advocacy course, in addition to being required for accreditation, focuses primarily on developing advocacy skills for working with underserved counseling populations and examining and participating in leadership in counseling organizations. Second, accreditation requirements also dictated changes in the required research courses, with courses in psychometric theory and qualitative research methods added to meet the unique research needs of practitioners and researchers in the counseling field. Third, a second internship was added to support the dual enrolled students who have limited backgrounds in clinical work and are not licensed counselors. Finally, specific electives were added to support standing coursework to meet accreditation curricula and enhance students programs of study.

Students will benefit from the proposed changes. They will be knowledgeable in counseling research, develop strong clinical skills, and obtain increased employment opportunities. Further, if the changes are not made, the program will be out of compliance with accreditation requirements. The proposed changes will strengthen the doctoral programs by graduating students that can practice in a variety of arenas and engage in research that utilizes methodologies that are congruent with the study of issues in counseling.

Student learning outcomes are as follows:

- Students will demonstrate knowledge and understanding of counseling theories and utilize ethically and culturally relevant clinical skills for conceptualization of clients from multiple theoretical perspectives (CACREP 6.B.1.c.).
- Students will understand their roles and responsibilities in educating counselors and apply culturally relevant pedagogy and curriculum development skills to teaching in counselor education (CACREP 6B 3.a.b.).
- Students will utilize research skills to engage in professional writing for journal and newsletter publication, conference proposal preparation, dissertation writing, and related research activities (CACREP 6.B. 4.h.i.).
- Students will develop skills and strategies for engaging in leadership, advocacy, and social justice initiatives aimed at addressing multiple levels of client treatment and counseling practices (CACREP 6.B. 5.J.).

Program review/assessment.

1. **Comparison with leading academic programs in the discipline.**

   The program is equivalent to other doctoral programs in the SEC. For example:

   a. University of Alabama-Tuscaloosa's program includes 18 hours of research coursework, 21 hours of clinical coursework, and a specific course on teaching in counseling and also leadership and advocacy in counselor education.

   b. University of Mississippi's doctoral counseling program includes 15 hours of research coursework, six hours of college teaching coursework and three hours of multicultural and advocacy coursework.

   c. University of Arkansas's' program includes 15 hours of research coursework, 12 hours of clinical coursework, and six hours of college teaching coursework.

   d. University of Tennessee at Knoxville's program includes 12 hours of research coursework, 12 hours of clinical coursework, three hours of university teaching coursework, and three hours of multicultural counseling coursework.

   e. Auburn university's program includes 15 hours of research coursework, 21 hours of clinical coursework, three hours of teaching in counseling coursework and three hours of diversity and social justice coursework.

   f. University of Kentucky's program includes 21 hours of research coursework, and nine hours of internship and leadership seminars.

2. **Graduate assessment and feedback on their preparedness for employment.**
   Graduates of the program are employed within a year in SEC states as well as nationally. Doctoral level individuals are directors of facilities as well as programs in Mississippi.

3. **Employer assessment and feedback of students' preparedness for employment.**
   Assessment from employers are collected yearly to insure that the doctoral programs graduates are meeting the needs of MSU, Mississippi, and national employers. Graduates are prominent across a number of platforms including department heads of counseling programs, renowned authors, principals, assistant principals, school counselors, mental health counselors and directors of clinical facilities and programs.

4. **Advisory Board or External Review assessment and feedback of the degree program.** The Advisory Board met in December of 2021, were supportive of the changes, and were complimentary of the changes and directions the program has taken. Additionally, all Counselor Educators in the Department of Counseling, Educational Psychology and Foundations completed a review of the current and proposed curriculum. All were in agreement of updating the doctoral programs coursework to reflect current trends in the field of counseling research and required accreditation course content.

Program modification proposal questions.

1. **Will this program change meet local, state, regional and national educational and cultural needs? If so, please describe**. Yes, this program modification will meet local, state, regional, and national educational and cultural needs. This is a CACREP accredited curriculum program and represents the highest standards of curricular training for doctoral programs in counseling in the United States. The additional knowledge and skills introduced through these courses will produce competent counselors who can work with a variety of populations and issues and engage in research relevant to that particular population. They will be able to be employed locally, state wide, in any region or nationally. In addition, the added modifications will better prepare graduates to diagnose and provide culturally sensitive therapy to diverse populations.

2. **Will this program change result in duplication in the System? If so, please describe.** This program will not result in duplication in the System.
3. **Will this program change /advance student diversity within the discipline? If so, please describe.** Yes, this program change will advance student diversity within the discipline. Coursework added will focus on diversity, advocacy, leadership, and teaching. It will be relevant to a wide spectrum of students and will have broad application and interest to applicants nationally and internationally. By adding the additional coursework and training, interest will increase and the students will become more marketable.
4. **Will this program change result in an increase in the potential placement of graduates in MS, the Southeast, and the U.S? If so, please describe**. Yes, this program change will result in an increase in the potential placement of graduates in MS, the Southeast, and the U.S. Graduates will be able to select from a variety of professional options-faculty member in academia, clinician, researcher, LPC- which will make them more marketable and open up more career choices. Further, accredited doctoral level practicums and internships are desirable in all CES programs in the US and internationally.
5. **Will this program change result in an increase in the potential salaries or graduates in MS, the Southeast, and the U.S? If so, please describe**. Yes, this program change will result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S. Graduates will have increased competencies, skills, and expertise, which will make them more marketable with the ability to negotiate more competitive salaries. Additionally, because of their research skills they will be able to produce more grants and engage in relevant research, both of which advance the field and increase their marketability.

4. Support

Please see letter from program faculty in the Department of Counseling, Educational Psychology, and Foundations supporting the changes to the degree program. The proposed modifications will not require additional support in terms of personnel and material requirements (faculty, lab space, classroom space, equipment).

5. Proposed 4-letter Abbreviation

No changes proposed.

6. Effective Date

Fall 2022

MISSISSIPPI STATE UNIVERSITY

Department of Counseling,
Educational Psychology, and Foundations
Mailstop 9727
175 President Circle
508 Allen Hall
Mississippi State, MS 39762
P. 662.325.3426
F. 662.325.3263
cep.msstate.edu

TO: Box Council and UCCC Committee Members

FROM: Starkville - Counselor Education Faculty

RE: Counselor Education Ph.D. Degree Program Modification

DATE: January 25, 2022

Dear Box Council and UCCC Committee Members,

This letter of support is offered by the Starkville Counselor Education Faculty members for the proposed degree modification to change the required credit hours in the Counselor Education Doctoral Program. As indicated by the signatures below, a majority of the program faculty at Starkville have approved the proposal as written for submission to the Box Council and the UCCC.

Program Faculty:

[Katherine Dooley, Ph.D.]

[Joan Looby, Ph.D.]

[Laith Mazahreh, Ph.D.]

[Cheryl Justice, Ph.D.]

[Rebecca M. Goldberg, Ph.D.]

[Sumedha Therthani, Ph.D.]

[Zaccheus J Ahonle, Ph.D.]

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: revise circuits/electronics sequence
Date Initiated: 12/21/21 **Effective Date:** Fall 2022

Current Degree Program Name: Bachelor of Science in Computer Engineering

Major: Computer Engineering **Concentration:**

New Degree Program Name:

Major: **Concentration:**

Summary of Proposed Changes:

The changes proposed are as follows:

1. Update the GPA requirements for CPE
2. Replace CSE 3324 Distributed Client Server Programming with a 3-hr professional enrichment elective
3. Add one credit hour to ECE 4723 Embedded Systems to create ECE 4724 Embedded Systems.
4. Remove ECE 4263 VLSI as an alternative to Embedded Systems course.

Approved:	Date:
Department Head	12/21/21
John Ball, PhD Digitally signed by John Ball, PhD DN: cn=John Ball, PhD, o=MSU, ou=ECE, email=jball@ece.msstate.edu, c=US Date: 2021.12.22 20:29:00 -06'00'	12/22/21
Chair, College or School Curriculum Committee	
Kari Babski-Reeves for Jason Keith	Digitally signed by Kari Babski-Reeves for Jason Keith Date: 2022.01.06 08:52:40 -06'00'
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

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

1. CATALOG DESCRIPTION

See table below.

2. CURRICULUM OUTLINE

The changes proposed are as follows:

1. Update the GPA requirements for CPE
2. Replace CSE 3324 Distributed Client Server Programming with a 3-hr professional enrichment elective
3. Add one credit hour to ECE 4723 Embedded Systems to create ECE 4724 Embedded Systems.

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:
Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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. • Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.	Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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. • Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.

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.	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.
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 and Java 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.	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 and Java 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, 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:	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) • make a C average on all hours scheduled and rescheduled at MSU (2.00 or better MSU GPA) • *earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes scheduled and rescheduled at all institutions attended, including MSU* The computer engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. 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 an overall C average on all hours scheduled and rescheduled at all institutions attended, including MSU (2.00 or better cumulative GPA) • 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 computer engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. 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.

CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
EN 1103 English Comp I or EN 1104 Expanded English 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	6
Fine Arts: see General Education courses	3	Fine Arts: see General Education courses	3
Natural Sciences see Major Core		Natural Sciences see Major Core	
Math see Major Core		Math see Major Core	
Humanities see General Education courses	6	Humanities see General Education courses	6
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 2733 Calculus III	3
MA 2743 Calculus IV	3	MA 2743 Calculus IV	3
MA 3113 Introduction to Linear Algebra	3	MA 3113 Introduction to Linear Algebra	3
MA 3253 Differential Equations I	3	MA 3253 Differential Equations I	3
IE 4613 Engineering Statistics I	3	IE 4613 Engineering Statistics I	3
CH 1213 Chemistry I	3	CH 1213 Chemistry I	3
CH 1211 Investigations in Chemistry I	1	CH 1211 Investigations in Chemistry I	1
PH 2213 Physics I	3	PH 2213 Physics I	3
PH 2223 Physics II	3	PH 2223 Physics II	3
Engineering Topics (76h)		Engineering Topics (76h)	
CSE 1284 Introduction to Computer Programming	4	CSE 1284 Introduction to Computer Programming	4
CSE 1384 Intermediate Computer Programming	4	CSE 1384 Intermediate Computer Programming	4
CSE 2383 Data Structures and Analysis of Algorithms	3	CSE 2383 Data Structures and Analysis of Algorithms	3
CSE 2813 Discrete Structures	3	CSE 2813 Discrete Structures	3
CSE 3324 Distributed Client/Server Programming	*4*	CSE 4733 Operating Systems I	3
CSE 4733 Operating Systems I	3	CSE 4833 Intro Analysis of Algorithms	3
CSE 4833 Intro Analysis of Algorithms	3	ECE 1013 Introduction to ECE Design I	3
ECE 1013 Introduction to ECE Design I	3	ECE 1022 Introduction to ECE Design II	2
ECE 1022 Introduction to ECE Design II	2	ECE 3423 Circuits I	3
ECE 3423 Circuits I	3	ECE 3421 Circuits I Lab	1
ECE 3421 Circuits I Lab	1	ECE 3433 Circuits II	3
ECE 3433 Circuits II	3	ECE 3244 Electronics I	4
ECE 3244 Electronics I	4	ECE 3443 Signals and Systems	3
ECE 3443 Signals and Systems	3	ECE 3714 Digital Devices and Logic Design	4
ECE 3714 Digital Devices and Logic Design	4	ECE 3724 Microprocessors	4
ECE 3724 Microprocessors	4	**ECE 4724 Embedded Systems**	**4**
ECE 4723 Embedded Systems or ECE 4263 Principles of VLSI Design	*3*	ECE 4532 CPE Design I	2
ECE 4532 CPE Design I	2	ECE 4542 CPE Design II	2
ECE 4542 CPE Design II	2	ECE 4713 Computer Architecture	3
ECE 4713 Computer Architecture	3	ECE 4743 Digital System Design	3
ECE 4743 Digital System Design	3	ECE 4833 Data Communication and Computer Networks	3
ECE 4833 Data Communication and Computer Networks	3	CPE technical electives (6h)	6
CPE technical electives (6h)	6	**Professional Enrichment elective (3h)**	**3**
Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4532, ECE 4542, and GE 3513		Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4532, ECE 4542, and GE 3513	
Writing Requirement GE 3513 Technical Writing	3	Writing Requirement GE 3513 Technical Writing	3
Computer Literacy Fulfilled in Engineering Topics courses		Computer Literacy Fulfilled in Engineering Topics courses	
Concentration Courses		Concentration Courses	
Total Hours	128	Total Hours	128

3. JUSTIFICATION AND STUDENT LEARNING OUTCOMES

The degree program will require the same number of credit hours (128 total credit hours) with these changes, but the new format will allow us to reorganize topics to be consistent with current trends. Further, the addition of a professional enrichment elective to the CPE program, similar to what we have in place for our EE program, will allow students greater flexibility when completing their degree.

1. **CPE Degree Program GPA Updates:** A degree program change initiated on Feb 1, 2018 and discussed at the March 23, 2018 UCCC meeting modified the CPE degree program GPA requirements. Prior to the change, CPE had four requirements: Cumulative GPA, MSU GPA, MSU Degree Program GPA, and Engineering Topics GPA.
    a. The change removed the **MSU Degree Program GPA** requirement, which we have since learned is required by EOP 21. The MSU Degree Program GPA must be included in the list of GPA requirements to clearly state all GPA requirements and avoid student confusion. This degree modification will correct that omission.
    b. The change modified the **Engineering Topics GPA** requirement by increasing the GPA requirement from a 2.0 to a 2.5. However, the faculty intent was to simultaneously strike "scheduled and rescheduled" from the requirement. During advising and graduation audits, we realized the original degree modification did not strike that language. After a review of historical meeting minutes, the ECE Undergraduate Committee reviewed this concern and reaffirmed the original intent of the GPA modification. The ECE faculty voted to reaffirm the recommendation to strike the "scheduled and rescheduled" in the Engineering Topics GPA requirements and to specify that the 2.5 GPA requirement threshold apply only to ECE and CSE courses used in a student's final program of study. The change is "earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes ~~scheduled and rescheduled~~ at all institutions attended, including MSU, that are applied toward meeting degree requirements." This modification is to ensure the 2.5 Engineering Topics GPA requirement is consistent with the original intention of the ECE faculty. If applied to all courses scheduled and rescheduled, the faculty view a threshold of 2.5 as excessive.
2. **Replace CSE 3324 DCSP with a 3-hour professional enrichment elective.** The CSE Department initiated a degree modification for the CS program in March 2020 and deleted CSE 3324 because "the course has outlived its relevancy in the technical landscape." The ECE Department is replacing CSE 3324 with a professional enrichment elective. A Professional Enrichment Elective is similar to a technical elective but allows more flexibility for students to pursue options relevant to their individual career goals. Currently our other degree program, EE, has Professional Enrichment Electives, but the CPE program does not. (For more information about Professional Enrichment, see definitions here: https://www.ece.msstate.edu/academics/undergraduate/electrical-engineering-undergraduate-program/professional-enrichment-elective/)

3. **Add one credit hour to ECE 4723 Embedded Systems to create ECE 4724 Embedded Systems.** The CSE 3324 change replaces a four-credit hour course with a three-credit hour professional enrichment elective. After a review of the entire CPE degree program, the ECE faculty voted unanimously to add the credit hour to Embedded Systems. This will allow for an additional hour of lecture that will support incorporating any key topics that need to be included as a result of deleting the prerequisite course CSE 3324 and replacing it with a professional enrichment elective (see item 2 above).
4. **Remove ECE4263 VLSI as an alternative course to ECE 4723 (proposed 4724).** VLSI has outlived its relevancy and has not been taught in several years.

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 the attached letter from the ECE Undergraduate Committee. Changes in this degree program were discussed multiple times throughout the 2020-2021 academic year. Changes were recommended by the

ECE Undergraduate Committee by unanimous vote in their March 22, 2021 meeting and approved by a vote of the ECE faculty on March 26, 2021.

See letter of support from CSE Department.

5. PROPOSED 4-LETTER ABBREVIATION

No changes

6. EFFECTIVE DATE

Fall 2022

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: add distance learning to an existing program

Date Initiated: 12/21/21 **Effective Date:** Fall 2022

Current Degree Program Name: Bachelor of Science in Electrical Engineering

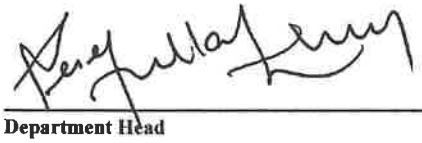
Major: Electrical Engineering **Concentration:** Electrical Engineering, Power and Energy Engineering

Major: no change **Concentration:** no change

Summary of Proposed Changes:

Add distance learning to existing degree

Approved: **Date:**



Department Head

12/21/21

John Ball, PhD Digitally signed by John Ball, PhD
DN: cn=John Ball, PhD, o=MSU, ou=ECE, email=jeball@ece.msstate.edu, c=US
Date: 2021.12.22 20:29:44 -06'00'

Chair, College or School Curriculum Committee

12/22/21

Kari Babski-Reeves for Jason Keith Digitally signed by Kari Babski-Reeves for Jason Keith
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Dean of College or School

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

PROPOSAL FOR THE MODIFICATION OF THE
B.S. IN ELECTRICAL ENGINEEIRNG

1. CATALOG DESCRIPTION

Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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.
- Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.

The electrical engineer is a principal contributor to the modern technological age in which we live today. Following in the footsteps of inventors such as Thomas Edison and Alexander Graham Bell, the electrical engineer is developing technology that improves the quality of life. Developments in microelectronics, telecommunications, and power systems have had a profound effect on each of us. Electrical engineers have affected all segments of our society such as transportation, medicine, and the entertainment industry, to name only a few. Indeed, the electrical engineer has principally been responsible for the advent of the computer age in which we live today as well as the computer's miniaturization and rapid expansion in computational power.

The curriculum in electrical engineering has a foundation based on the principles of the electrical and physical sciences and uses mathematics as a common language to facilitate the solution of engineering problems. The core curriculum consists of a sequence of courses in digital devices, circuits and electronics, electromagnetic field theory, and modern energy conversion. In the senior year, students have the opportunity to take additional course work in one or more technical areas that include: telecommunications, electromagnetics, power systems, high voltage, feedback control systems, microelectronics, signal processing, and computer systems. Supporting course work outside electrical engineering consists of a strong background in mathematics, physical sciences, computer programming, social sciences, fine arts, humanities, and personal communication skills. Computers are used extensively throughout the curriculum, and students are expected to become proficient in higher-order programming languages and several application software tools. Although the concept of design is stressed throughout the program so as to emphasize the problem-solving skills of the engineer, the senior year includes a capstone design experience where much of the previous study is culminated.

Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment. Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE 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)
- 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 electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

For a list of online tuition, instructional support, and other distance fees, please see the Controller's web site at: https://www.controller.msstate.edu/accountservices/tuition/

2. CURRICULUM OUTLINE

Our Electrical Engineering program has two concentrations: Electrical Engineering and Power and Energy Engineering. The curriculum for both is very similar but key differences will be addressed.

Extent of the degree that is offered through distance learning:
For the Electrical Engineering concentration, as of this submission, 100 out of 128 hours required for the degree are approved and offered via distance; 78% of the program can be completed via distance. For the Power and Energy Engineering concentration, as of this submission, 94 out of 128 hours required for the degree are approved and offered via distance; 73% of the program can be completed via distance.

For both concentrations, by Fall 2022, we anticipate **115 out of 128 total hours (~90%)** required for both degree concentrations will be approved and offered through MSU's distance education offerings. The remaining **13 hours** will currently need to be completed through MSU's Starkville, Meridian, or Gulf Coast campus offerings, or transferred to MSU from another institution.

Details of courses currently offered / planned to be offered as face-to-face only:
For both concentrations, the courses (13 hours) that are either not currently approved for MSU's distance offerings (and not pending approval) **or** are not offered online frequently enough to meet our undergraduate student needs are listed as follows:

- CH 1211 Chemistry Lab
- CH 1213 Chemistry I
- PH 2213 Physics I
- PH 2223 Physics II
- MA 2743 Calculus IV

After consulting with the departments associated with these courses, we anticipate 10 hours (CH and PH courses) will remain face-to-face for the foreseeable future. It is possible MA 2743 may become a distance-approved course. These courses are the 13 hours that will need to be completed through MSU's Starkville, Meridian, or Gulf Coast campus offerings, or transferred to MSU from another institution.

All 13 hours are widely available on MSU campuses and at Mississippi community colleges and other institutions of higher learning throughout the country. We do not anticipate any hardships for students related to access for these 13 credit-hours.

Details of courses currently offered as face-to-face but planned to be offered via distance:

For both concentrations, within our Department, there are currently 15 hours of ECE courses required for the B.S. in Electrical Engineering that are pending distance approval in the UCCC workflow. Details are as follows:

- ECE 3323 Electromagnetics II – passed contingent at Sept 3, 2021 meeting; contingencises have been addressed and are pending final approval
- ECE 3614 Fundamentals of Energy Systems – in UCCC workflow for distance approval
- ECE 3714 Digital Devices and Logic Design – in UCCC workflow for distance approval
- ECE 3724 Microprocessors – in UCCC workflow for distance approval

For the Power and Energy concentration only, there are 6 additional required hours that are not approved for distance at the 4000-level (but are approved and taught via distance at the 6000-level). Due to prerequisites requirements, newly admitted distance EE students would not be eligible to enroll in these courses until Spring 2023 at the earliest. These courses will be submitted into the UCCC workflow by the end of Spring 2022, which would allow ample time for the courses to become available for students.

- ECE 4613 Power Transmission Systems – approved at 6000-level for distance; will submit for 4000-level distance approval in Spring 2022
- ECE 4633 Power Distribution Systems – approved at 6000-level for distance; will submit for 4000-level distance approval in Spring 2022

No changes are proposed to the curriculum. The current curriculum tables are provided below for reference.

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science in Electrical Engineering Major: Electrical Engineering Concentration: N/A	Degree: Bachelor of Science in Electrical Engineering Major: Electrical Engineering Concentration: N/A
Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or Computer Engineering will: • Be recognized by their peers as fundamentally sound in the application of mathematics, science, computing, and engineering.	Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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.
- Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.

The electrical engineer is a principal contributor to the modern technological age in which we live today. Following in the footsteps of inventors such as Thomas Edison and Alexander Graham Bell, the electrical engineer is developing technology that improves the quality of life. Developments in microelectronics, telecommunications, and power systems have had a profound effect on each of us. Electrical engineers have affected all segments of our society such as transportation, medicine, and the entertainment industry, to name only a few. Indeed, the electrical engineer has principally been responsible for the advent of the computer age in which we live today as well as the computer's miniaturization and rapid expansion in computational power.

The curriculum in electrical engineering has a foundation based on the principles of the electrical and physical sciences and uses mathematics as a common language to facilitate the solution of engineering problems. The core curriculum consists of a sequence of courses in digital devices, circuits and electronics, electromagnetic field theory, and modern energy conversion. In the senior year, students have the opportunity to take additional course work in one or more technical areas that include: telecommunications, electromagnetics, power systems, high voltage, feedback control systems, microelectronics, signal processing, and computer systems. Supporting course work outside electrical engineering consists of a strong background in mathematics, physical sciences, computer programming, social sciences, fine arts, humanities, and personal communication skills. Computers are used extensively throughout the curriculum, and students are expected to become proficient in higher-order programming languages and several application software tools. Although the concept of design is stressed throughout the program so as to emphasize the problem-solving skills of the engineer, the senior year includes a capstone design experience where much of the previous study is

- Be engaged in the practice of Electrical or 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.
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culminated. Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment. Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE 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) • 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 electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.	culminated. Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment. Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE 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) • 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 electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.
"[Click here and type old concentration description]"	"[Click here and type old concentration description]"

CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
EN 1103 English Comp I or EN 1104 Expanded English 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	6
Fine Arts: see General Education courses	3	Fine Arts: see General Education courses	3
Natural Sciences see Major Core		Natural Sciences see Major Core	
Math see Major Core		Math see Major Core	
Humanities see General Education courses	6	Humanities see General Education courses	6
Social/Behavioral Sciences see General Education courses	6	Social/Behavioral Sciences see General Education courses	6

Major Core Courses		Major Core Courses	
Math and Basic Science (31h)		Math and Basic Science (31h)	
MA 1713 Calculus I	3	MA 1713 Calculus I	3
MA 1723 Calculus II	3	MA 1723 Calculus II	3
MA 2733 Calculus III	3	MA 2733 Calculus III	3
MA 2743 Calculus IV	3	MA 2743 Calculus IV	3
MA 3113 Introduction to Linear Algebra	3	MA 3113 Introduction to Linear Algebra	3
MA 3253 Differential Equations I	3	MA 3253 Differential Equations I	3
IE 4613 Engineering Statistics I	3	IE 4613 Engineering Statistics I	3
CH 1213 Chemistry I	3	CH 1213 Chemistry I	3
CH 1211 Investigations in Chemistry I	1	CH 1211 Investigations in Chemistry I	1
PH 2213 Physics I	3	PH 2213 Physics I	3
PH 2223 Physics II	3	PH 2223 Physics II	3
Engineering Topics (76h)		Engineering Topics (76h)	
CSE 1284 Introduction to Computer Programming	4	CSE 1284 Introduction to Computer Programming	4
CSE 1384 Intermediate Computer Programming	4	CSE 1384 Intermediate Computer Programming	4
CSE 2383 Data Structures and Analysis of Algorithms	3	CSE 2383 Data Structures and Analysis of Algorithms	3
ECE 1013 Introduction to ECE Design I	3	ECE 1013 Introduction to ECE Design I	3
ECE 1022 Introduction to ECE Design II	2	ECE 1022 Introduction to ECE Design II	2
ECE 3423 Circuits I	3	ECE 3423 Circuits I	3
ECE 3421 Circuits I Lab	1	ECE 3421 Circuits I Lab	1
ECE 3433 Circuits II	3	ECE 3433 Circuits II	3
ECE 3244 Electronics I	4	ECE 3244 Electronics I	4
ECE 3443 Signals and Systems	3	ECE 3443 Signals and Systems	3
ECE 3313 Electromagnetics I	3	ECE 3313 Electromagnetics I	3
ECE 3323 Electromagnetics II	3	ECE 3323 Electromagnetics II	3
ECE 3614 Fundamentals of Energy Systems	4	ECE 3614 Fundamentals of Energy Systems	4
ECE 4512 EE Design I	2	ECE 4512 EE Design I	2
ECE 4522 EE Design II	2	ECE 4522 EE Design II	2
ECE 3714 Digital Devices and Logic Design	4	ECE 3714 Digital Devices and Logic Design	4
ECE 3724 Microprocessors	4	ECE 3724 Microprocessors	4
EM 2413 Engineering Mechanics I or ME 3513 Thermodynamics I	3	EM 2413 Engineering Mechanics I or ME 3513 Thermodynamics I	3
EE technical electives	12	EE technical electives	12
Engineering Science elective (3h)	3	Engineering Science elective (3h)	3
Professional Enrichment elective (3h)	3	Professional Enrichment elective (3h)	3
Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4512, ECE 4522, and GE 3513		Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4512, ECE 4522, and GE 3513	
Writing Requirement		Writing Requirement	
GE 3513 Technical Writing	3	GE 3513 Technical Writing	3
Computer Literacy Fulfilled in Engineering Topics courses		Computer Literacy Fulfilled in Engineering Topics courses	
Concentration Courses		Concentration Courses	

	12		12
Total Hours	128	Total Hours	128

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science in Electrical Engineering Major: Electrical Engineering Concentration: Power and Energy Engineering	Degree: Bachelor of Science in Electrical Engineering Major: Electrical Engineering Concentration: Power and Energy Engineering
Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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. • Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment. The electrical engineer is a principal contributor to the modern technological age in which we live today. Following in the footsteps of inventors such as Thomas Edison and Alexander Graham Bell, the electrical engineer is developing technology that improves the quality of life. Developments in microelectronics, telecommunications, and power systems have had a profound effect on each of us. Electrical engineers have affected all segments of our society such as transportation, medicine, and the entertainment industry, to name only a few. Indeed, the electrical engineer has principally been responsible for the advent of the computer age in which we live today as well as the computer's miniaturization and rapid expansion in computational power.	Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or 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 Electrical or 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. • Be productive and demonstrate leadership in the practice of Electrical or 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 Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment. The electrical engineer is a principal contributor to the modern technological age in which we live today. Following in the footsteps of inventors such as Thomas Edison and Alexander Graham Bell, the electrical engineer is developing technology that improves the quality of life. Developments in microelectronics, telecommunications, and power systems have had a profound effect on each of us. Electrical engineers have affected all segments of our society such as transportation, medicine, and the entertainment industry, to name only a few. Indeed, the electrical engineer has principally been responsible for the advent of the computer age in which we live today as well as the computer's miniaturization and rapid expansion in computational power.

The curriculum in electrical engineering has a foundation based on the principles of the electrical and physical sciences and uses mathematics as a common language to facilitate the solution of engineering problems. The core curriculum consists of a sequence of courses in digital devices, circuits and electronics, electromagnetic field theory, and modern energy conversion. In the senior year, students have the opportunity to take additional course work in one or more technical areas that include: telecommunications, electromagnetics, power systems, high voltage, feedback control systems, microelectronics, signal processing, and computer systems. Supporting course work outside electrical engineering consists of a strong background in mathematics, physical sciences, computer programming, social sciences, fine arts, humanities, and personal communication skills. Computers are used extensively throughout the curriculum, and students are expected to become proficient in higher-order programming languages and several application software tools. Although the concept of design is stressed throughout the program so as to emphasize the problem-solving skills of the engineer, the senior year includes a capstone design experience where much of the previous study is culminated. Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment. Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE 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) • 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 electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.	The curriculum in electrical engineering has a foundation based on the principles of the electrical and physical sciences and uses mathematics as a common language to facilitate the solution of engineering problems. The core curriculum consists of a sequence of courses in digital devices, circuits and electronics, electromagnetic field theory, and modern energy conversion. In the senior year, students have the opportunity to take additional course work in one or more technical areas that include: telecommunications, electromagnetics, power systems, high voltage, feedback control systems, microelectronics, signal processing, and computer systems. Supporting course work outside electrical engineering consists of a strong background in mathematics, physical sciences, computer programming, social sciences, fine arts, humanities, and personal communication skills. Computers are used extensively throughout the curriculum, and students are expected to become proficient in higher-order programming languages and several application software tools. Although the concept of design is stressed throughout the program so as to emphasize the problem-solving skills of the engineer, the senior year includes a capstone design experience where much of the previous study is culminated. Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment. Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE 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) • 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 electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.
The electrical engineering concentration allows students the flexibility to take a broad range of course in a minimum of two topic areas. Students may take a variety of courses that fit their individual interests in electrical engineering.	The electrical engineering concentration allows students the flexibility to take a broad range of course in a minimum of two topic areas. Students may take a variety of courses that fit their individual interests in electrical engineering.

CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
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Fine Arts: see General Education courses	3	Fine Arts: see General Education courses	3
Natural Sciences see Major Core		Natural Sciences see Major Core	
Math see Major Core		Math see Major Core	
Humanities see General Education courses	6	Humanities see General Education courses	6
Social/Behavioral Sciences see General Education courses	6	Social/Behavioral Sciences see General Education courses	6
Major Core Courses		Major Core Courses	
Math and Basic Science (31h)		Math and Basic Science (31h)	
MA 1713 Calculus I	3	MA 1713 Calculus I	3
MA 1723 Calculus II	3	MA 1723 Calculus II	3
MA 2733 Calculus III	3	MA 2733 Calculus III	3
MA 2743 Calculus IV	3	MA 2743 Calculus IV	3
MA 3113 Introduction to Linear Algebra	3	MA 3113 Introduction to Linear Algebra	3
MA 3253 Differential Equations I	3	MA 3253 Differential Equations I	3
IE 4613 Engineering Statistics I	3	IE 4613 Engineering Statistics I	3
CH 1213 Chemistry I	3	CH 1213 Chemistry I	3
CH 1211 Investigations in Chemistry I	1	CH 1211 Investigations in Chemistry I	1
PH 2213 Physics I	3	PH 2213 Physics I	3
PH 2223 Physics II	3	PH 2223 Physics II	3
Engineering Topics (64h)		Engineering Topics (64h)	
CSE 1284 Introduction to Computer Programming	4	CSE 1284 Introduction to Computer Programming	4
CSE 1384 Intermediate Computer Programming	4	CSE 1384 Intermediate Computer Programming	4
CSE 2383 Data Structures and Analysis of Algorithms	3	CSE 2383 Data Structures and Analysis of Algorithms	3
ECE 1013 Introduction to ECE Design I	3	ECE 1013 Introduction to ECE Design I	3
ECE 1022 Introduction to ECE Design II	2	ECE 1022 Introduction to ECE Design II	2
ECE 3423 Circuits I	3	ECE 3423 Circuits I	3
ECE 3421 Circuits I Lab	1	ECE 3421 Circuits I Lab	1
ECE 3433 Circuits II	3	ECE 3433 Circuits II	3
ECE 3244 Electronics I	4	ECE 3244 Electronics I	4
ECE 3443 Signals and Systems	3	ECE 3443 Signals and Systems	3
ECE 3313 Electromagnetics I	3	ECE 3313 Electromagnetics I	3
ECE 3323 Electromagnetics II	3	ECE 3323 Electromagnetics II	3

ECE 3614 Fundamentals of Energy Systems ECE 4512 EE Design I ECE 4522 EE Design II ECE 3714 Digital Devices and Logic Design ECE 3724 Microprocessors EM 2413 Engineering Mechanics I or ME 3513 Thermodynamics I Engineering Science elective (3h) Professional Enrichment elective (3h) Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4512, ECE 4522, and GE 3513 Writing Requirement GE 3513 Technical Writing Computer Literacy Fulfilled in Engineering Topics courses	4 2 2 4 4 3 3 3 3	ECE 3614 Fundamentals of Energy Systems ECE 4512 EE Design I ECE 4522 EE Design II ECE 3714 Digital Devices and Logic Design ECE 3724 Microprocessors EM 2413 Engineering Mechanics I or ME 3513 Thermodynamics I Engineering Science elective (3h) Professional Enrichment elective (3h) Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4512, ECE 4522, and GE 3513 Writing Requirement GE 3513 Technical Writing Computer Literacy Fulfilled in Engineering Topics courses	4 2 2 4 4 3 3 3 3
Concentration Courses Power and Energy Engineering (6h) ECE 4613 Power Transmission Systems ECE 4633 Power Distribution Systems Power and Energy Electives (6h) Choose from: ECE 4643 Power Systems Relaying & Control ECE 4653 Power Electronics ECE 4663 Insulation Coordination in Electric Power Systems ECE 4673 Fundamentals of High Voltage Engineering (see advisor for list of additional approved elective courses)	 3 3 6	Concentration Courses Power and Energy Engineering (6h) ECE 4613 Power Transmission Systems ECE 4633 Power Distribution Systems Power and Energy Electives (6h) Choose from: ECE 4643 Power Systems Relaying & Control ECE 4653 Power Electronics ECE 4663 Insulation Coordination in Electric Power Systems ECE 4673 Fundamentals of High Voltage Engineering (see advisor for list of additional approved elective courses)	 3 3 6
Total Hours	128	Total Hours	128

3. JUSTIFICATION FOR DISTANCE LEARNING OUTCOMES

Electrical engineering is an important field for a wide range of audiences. Electrical engineers are employed in a variety of industries. We have had numerous inquiries about distance offerings from potential students who have earned a two-year electrical technology or similar degree and are working full-time in industry. They cannot take 2-3 years off from work to complete the requirements for an

electrical engineering degree, but not having the degree prevents them from advancing their careers. To some extent, our EE degree program on the MS Gulf Coast campus has addressed this for potential students located on the coast – we offer night classes on the Gulf Coast campus. However, the face-to-face requirement still excludes numerous potential students. An online program will allow those students to fulfill their needs and earn an EE degree.

The ECE faculty are committed to distance education. Numerous ECE faculty have been successfully supporting our well-established online graduate degrees in Electrical and Computer Engineering for over a decade. Current distance courses in ECE include a variety of online learning techniques such as videos with quizzes, synchronous activities, office hours, and other active learning activities. In the Fall 2021 semester, ECE faculty participated in two distance training sessions arranged for the department by BCOE distance education staff. ECE distance classes have received positive student survey results, and we intend to use our proven methods for offering courses for our undergraduate students. The program will be delivered through a mix of synchronous and asynchronous courses recorded via Webex or in the BCOE distance classrooms.

TARGET AUDIENCES

- Regional traditional students who need the option of distance education to complete their degree for various reasons, including taking care of sick parent, needing to work full-time, co-op, or any other reason.
- Non-traditional students who already work in the electrical field and want to complete a degree in the area in which they see a long-term future.
- Non-traditional students who started a degree in electrical engineering at some point, never finished the degree, and have a desire to finish the degree.
- Veterans and military personnel wanting to work in electrical and computer engineering.

4. LEARNING OUTCOMES

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

5. EFFECTIVE DATE
Fall 2022

6. CONTACT PERSON
Jean Mohammadi-Aragh, jean@ece.msstate.edu, 662-325-2042

7. LETTER OF SUPPORT
See attached

8. IHL FORM
See attached

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: Computer Science & Eng.**

Contact Person: Dr. T.J. Jankun-Kelly **Mail Stop: 9637 E-mail: tjk@cse.msstate.edu**

Nature of Change: Remove concentration **Date Initiated: 3/22 Effective Date: 8/22**
Modify concentration

Current Degree Program Name: Cyber Security & Operations (Starkville & Distance)
Major: MS **Concentration: Cyber Operations, ~~Cyber Defense~~**

Summary of Proposed Changes:
Remove Cyber Defense Concentration; modify Cyber Operations Concentration

Approved:	**Date:**
Department Head	3/7/2022
Chair, College or School Curriculum Committee	3/10/22
for Jason Keith **Dean of College or School**	3/11/2022
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

1. Catalog Description

The Master of Science in Cyber Security and Operations is designed for students who wish to help meet the challenges posed by increasing cyber-threats. Using a multidisciplinary approach, the program is designed to provide students with a focused education within a broad analytical framework for evaluating, understand, and solving cyber security problems. Starkville-campus and online programs are offered, thesis or non-thesis.

The degree will focus on those aspects of cyber security that are needed to operate in the cyber domain. Material will prepare the student for advanced operations in the cyber domain such as penetration testing, after action analysis, and malware analysis. This degree is designed to satisfy the requirements for the Center of Academic Excellence in Cyber Operations program of the Department of Defense.

For a list of online tuition, instructional support, and other distance fees, please see the Controller's web site at https://www.controller.msstate.edu/accountservices/tuition/.

2. Graduate Degree Curriculum Outline

Deletions in *italics* and additions in **bold.**

CURRENT Degree Description	PROPOSED Degree Description
Degree: Cyber Security and Operations Major: MS (Thesis & Non-Thesis) Concentrations: *Cyber Defense, Cyber Operations*	Degree: Cyber Security and Operations Major: MS (Thesis & Non-Thesis) Concentrations: **None**

The Master of Science in Cyber Security and Operations is designed for students who wish to help meet the challenges posed by increasing cyber-threats. Using a multidisciplinary approach, the program is designed to provide students with a focused education within a broad analytical framework for evaluating, understand, and solving cyber security problems. *Either concentration will allow a thesis or non-thesis option.* Starkville-campus and online programs are offered. *The Cyber Defense concentration will focus on those aspects of cyber security needed to prepare an enterprise level system to protect itself. Material will prepare the students for developing cyber security policies to comply with existing and future laws, conducting risk assessment in enterprise to determine compliance with requirements and implementing security solutions for the enterprise.* The *Cyber Operations concentration* will focus on those aspects of cyber security that are needed to operate in the cyber domain. Material will prepare the student for advanced operations in the cyber domain such as penetration testing, after action analysis, and malware analysis. This *concentration* is designed to satisfy the requirements for the Center of Academic Excellence in Cyber Operations program of the Department of Defense. For a list of online tuition, instructional support, and other distance fees, please see the Controller's web site at https://www.controller.msstate.edu/accountservices/tuition/.	The Master of Science in Cyber Security and Operations is designed for students who wish to help meet the challenges posed by increasing cyber-threats. Using a multidisciplinary approach, the program is designed to provide students with a focused education within a broad analytical framework for evaluating, understand, and solving cyber security problems. Starkville-campus and online programs are offered**, thesis or non-thesis.** The **degree** will focus on those aspects of cyber security that are needed to operate in the cyber domain. Material will prepare the student for advanced operations in the cyber domain such as penetration testing, after action analysis, and malware analysis. This **degree** is designed to satisfy the requirements for the Center of Academic Excellence in Cyber Operations program of the Department of Defense.

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
Major Required Courses	*10*	Major Required Courses	
• CSE 8011 Graduate Seminar		• CSE 8011 Graduate Seminar	1
• CSE 6243 Information and Computer Security		• CSE 6243 Information and Computer Security	3
• CSE 6173 Cryptography		• CSE 6173 Cryptography	3
• CSE 6383 Network Security		• **CSE 6253 Secure Software Engineering**	**3**
		• **CSE 6263 Software Reverse Engineering**	**3**
		• CSE 6383 Network Security	3
		• **CSE 8713 Advanced Cyber Operations**	**3**
		• **CSE 8763/ECE 8823 Wireless Networks**	**3**
		• **Electives**	**3**

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Professor and Billie J. Ball Endowed Professor in Engineering
Director of the Social, Therapeutic, and Robotic Systems (STaRS) Lab
cbethel@cse.msstate.edu

March 4, 2022

Dr. Andy Perkins, Chair
University Committee on Courses and Curricula
PO Box 5268
Mississippi State, MS 39762

Dr. Perkins:

The Computer Science and Engineering faculty voted to support the following changes at a faculty meeting held on March 4, 2022.

- Modifying lecture topics and adding an additional 1 credit hour lab component to CSE 3723
- Modifying lecture topics for CSE 4733/6733 Operating Systems I and CSE 4273/6273 Introduction to Computer Forensics
- Modifying the MS in Cyber Security and Operations to remove concentrations and change a number of the required courses

Please feel free to contact me if there are any questions or concerns.

Sincerely,

Cindy Bethel, Ph.D.
CSE Courses and Curricula Committee Chair
Professor

Jingdao Chen, Ph.D.
CSE Courses and Curricula Committee Member
Assistant Professor

Joshua Crowson
CSE Courses and Curricula Committee Member
Instructor

Kortni Neal
CSE Courses and Curricula Committee Member
Instructor

Concentration: Cyber Defense • *BIS 6113 Business Information Systems Security Management* • *CSE 6273 Introduction to Computer Forensics* • *Advanced Cyber Defense electives*	 *3* *3* *9*	(Removed)	
Concentration: Cyber Operations • *CSE 6363 Software Reverse Engineering* • *CSE 8753/ECE 8823 Wireless Networks* • *Advanced Cyber Operations electives*	 *3* *3* *9*	(Removed)	
Thesis or Non-Thesis Option • Thesis Option: CSE 8000 Thesis Research/Thesis in Computer Science and Engineering: 6 hours • Non-Thesis Option: 6 hours of CSE or ECE electives	6	Thesis or Non-Thesis Option • Thesis Option: CSE 8000 Thesis Research/ Thesis in Computer Science and Engineering: 6 hours • Non-Thesis Option: 6 hours of CSE or ECE electives	6
Total Hours	31	Total Hours	31

3. Justification

Due to changes in requirements for the National Security Agency Center for Academic Excellence (CAE) in Cyber Operations, the MS CYSO degree must be modified to codify these requirements. In addition, due to lack of interest and need for the Defense concentration, it has been removed. As a program cannot have a single concentration, the Cyber Operations "concentration" will be retired and folded as the only part of the degree.

4. Learning Outcomes

Our learning outcomes have been updated to match CAE requirements:
- **Advanced knowledge in Cyber Operations** Students will be able to apply security first principles and practices. Measured via technical competency at the Comprehensive Exam and our Core classes.
- **Ability to Communicate Effectively** Students will be able to communicate effectively in a variety of professional contexts. Measured via presentation quality in courses and Comprehensive Exam.
- **Ethical Preparation** Students will be able to make informed judgements in security practice based on legal an ethical principles. Evaluated based upon ethical in-class exercises.
- **Ability to Work as a Team** Students will function effectively as a member or as leaders in activities appropriate to cyber security and operations. Measured via group briefing exercises.
- **Demonstrable Operational Ability** Students will be able to analyze and evaluate systems with respect to maintaining cyber operations in the presence of risks and threats. Measured via threat mitigation exercises.

5. Proposed 4-Letter Abbreviation

The MSU registrar has adopted CYSO as the abbreviation of Cyber Operation degrees.

6. Effective Date

Fall 2022

APPROVAL FORM FOR

DEGREE PROGRAMS

MISSISSIPPI STATE UNIVERSITY

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College: BCoE **Department:** Industrial and Systems Engineering

Contact Person: Dr. Linkan Bian **Mail Stop:** 9542 **E-mail:** bian@ise.msstate.edu

Nature of Change: Modification **Date Initiated:** 02/25/2022 **Effective Date:** 08/16/2022

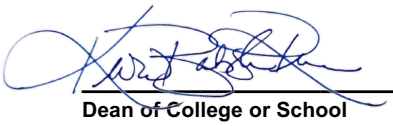
Degree Program Name: Master of Science in Industrial and Systems Engineering

Major: Industrial and Systems Engineering
Concentration:
1. Human Factors and Ergonomics
2. Industrial Systems
3. Operations Research
4. Management Systems Engineering
5. Manufacturing Systems

Major: Industrial and Systems Engineering
Concentration:
1. Human Factors and Ergonomics
2. Industrial Systems
3. Operations Research
4. Management Systems Engineering
5. Manufacturing Systems
6. Data Analytics

Proposed 4-letter Abbreviation: DAAS

Summary of Proposed Changes: The Data Analytics (DAAS) concentration option is designed for students who wish to advance their careers in data analytics. The industry-relevant curriculum gives students the skills to extract valuable insights from big data. In this program, students will learn expertise in statistical modeling, data management, machine learning, data visualization, and data-driven decision making related to industrial engineering applications, to meet the growing needs of industry, not-for-profits, government agencies, and other organizations.

Approved:	**Date:**
	3/1/2022
Department Head	
	3/10/22
Chair, College or School Curriculum Committee	
 for Jason Keith	3/11/2022
Dean of College or School	
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Linkan Bian, Ph.D.
bian@ise.msstate.edu

February 25, 2022

University Committee on Courses and Curricula
Mailstop: 9702
Mississippi State, MS 39762

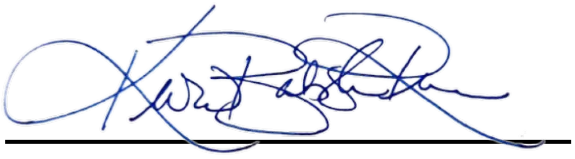
Dear UCCC,

The Industrial & Systems Engineering (ISE) faculty and the Graduate Committee support the approval of offering the Data Analytics (DAAS) MS Concentration program via on-campus and distance learning. All classes currently proposed to comprise the MS concentration program either have companion 6000 level sections or are 8000 courses that are approved for campus 1 and 5.

The ISE faculty voted unanimously to accept this new concentration into ISE curriculum offerings on February 25th should it be approved by UCCC.

These approvals are evidenced by the minutes from the ISE February 2022 meeting and the signature from the Graduate Committee Chair below.

Kari Babski-Reeves, PhD, CPE
Professor and Head
Industrial and Systems Engineering
Larry G Brown Endowed Professor
Associate Dean, Bagley College of Engineering



Linkan Bian, Ph.D.
Thomas B. & Terri L. Nusz Professor
Associate Professor
Graduate Committee Chair
Industrial and Systems Engineering

Linkan Bian

Digitally signed by Linkan Bian
Date: 2022.03.01 08:04:03 -06'00'

GRADUATE DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing Graduate Degree. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Please include the course prefix, number, and title in both columns. Expand rows as needed.

CURRENT Degree Description	PROPOSED Degree Description
Degree: M.S. Major: Industrial Engineering Concentrations: Human Factors and Ergonomics**,** Industrial Systems**,** Operations Research**,** Management Systems Engineering**,** Manufacturing Systems	Degree: M.S. Major: Industrial and Systems Engineering Concentrations: Human Factors and Ergonomics**,** Industrial Systems**,** Operations Research**,** Management Systems Engineering**,** Manufacturing Systems
Old degree catalog description: Admission Criteria Typically, an entering M.S. student should have a grade point average of 3.00 out of 4.00 for the junior and senior years. Likewise, an entering Ph.D. student with an M.S. degree should have a 3.50 out of 4.00 grade point average on the M.S. work, while a Ph.D. student entering with only a B.S. degree is expected to have a 3.50 out of 4.00 on the last two years of the undergraduate program. A student with a lower GPA may still be eligible for admission based on outstanding qualifications in other areas. All entering students must submit GRE general-test scores. International students must have a minimum TOEFL score of 550 PBT (79 iBT) or IELTS score of 6.5. The department reviews completed applications four times a year: February 15, May 15, August 15, and November 15. Incomplete or not fully processed applications will be reviewed during the next cycle. Provisional Admission An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's Program of Study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship. Academic Performance In addition to the criteria defined in the current Bulletin of the Graduate School, unsatisfactory performance in	New degree catalog description: Admission Criteria Typically, an entering M.S. student should have a grade point average of 3.00 out of 4.00 for the junior and senior years. Likewise, an entering Ph.D. student with an M.S. degree should have a 3.50 out of 4.00 grade point average on the M.S. work, while a Ph.D. student entering with only a B.S. degree is expected to have a 3.50 out of 4.00 on the last two years of the undergraduate program. A student with a lower GPA may still be eligible for admission based on outstanding qualifications in other areas. All entering students must submit GRE general-test scores. International students must have a minimum TOEFL score of 550 PBT (79 iBT) or IELTS score of 6.5. The department reviews completed applications four times a year: February 15, May 15, August 15, and November 15. Incomplete or not fully processed applications will be reviewed during the next cycle. Provisional Admission An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's Program of Study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship. Academic Performance In addition to the criteria defined in the current Bulletin of the Graduate School, unsatisfactory performance in

<table>
<tr>
<td>the graduate program in Industrial and Systems Engineering is defined as any of the following.

• Failure to maintain a 3.00 average in the M.S. program or 3.30 in the Ph.D. program,
• Failure of the qualifying exam (Ph.D. students only),
• Failure of the preliminary exam (Ph.D. students only);
• Failure of the comprehensive final exam (M.S. non-thesis option only),
• Unsatisfactory evaluation of thesis or dissertation, or
• A failure of the required component of the program of study.

Any one of these will constitute the basis for review for possible dismissal. If the students drops six or more quality points below the required average (3.00 for M.S. or 3.30 for Ph.D.), the graduate coordinator will review the record along with the student's graduate committee and will recommend a final course of action, which will be immediate dismissal or the establishment of a probationary period in which corrective action must take place.

While on probation, the student is not eligible to receive an assistantship and is required to raise his/her cumulative GPA to 3.00 for M.S. or 3.30 for Ph.D. by the end of the following semester of enrollment. During that semester, the student must enroll in 9 credit hours of coursework; Directed Individual Study courses are excluded.</td>
<td>the graduate program in Industrial and Systems Engineering is defined as any of the following.

• Failure to maintain a 3.00 average in the M.S. program or 3.30 in the Ph.D. program,
• Failure of the qualifying exam (Ph.D. students only),
• Failure of the preliminary exam (Ph.D. students only);
• Failure of the comprehensive final exam (M.S. non-thesis option only),
• Unsatisfactory evaluation of thesis or dissertation, or
• A failure of the required component of the program of study.

Any one of these will constitute the basis for review for possible dismissal. If the students drops six or more quality points below the required average (3.00 for M.S. or 3.30 for Ph.D.), the graduate coordinator will review the record along with the student's graduate committee and will recommend a final course of action, which will be immediate dismissal or the establishment of a probationary period in which corrective action must take place.

While on probation, the student is not eligible to receive an assistantship and is required to raise his/her cumulative GPA to 3.00 for M.S. or 3.30 for Ph.D. by the end of the following semester of enrollment. During that semester, the student must enroll in 9 credit hours of coursework; Directed Individual Study courses are excluded.</td>
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<tr>
<td>Old Concentration description:

Master of Science in Industrial Engineering with Human Factors and Ergonomics Concentration (HFE) – Thesis

Prerequisites (foundational courses) are:
• MA 1713
• MA 1723
• MA 2733
• MA 2743
• IE 3123
• IE 4613/6613

<table>
<tr><td>IE 6773</td><td>Systems Simulation I</td><td>3</td></tr>
<tr><td>IE 6623</td><td>Engineering Statistics II</td><td>3</td></tr>
<tr><td colspan="2">At least 3 HFE ISE courses</td><td>9</td></tr>
<tr><td>IE 8000</td><td>Thesis Research/ Thesis in Industrial Engineering</td><td>6</td></tr>
<tr><td colspan="2">At least one non-HFE ISE course</td><td>3</td></tr>
</table>
</td>
<td>New Concentration description:

Master of Science in Industrial Engineering with Human Factors and Ergonomics Concentration (HFE) – Thesis

Prerequisites (foundational courses) are:
• MA 1713
• MA 1723
• MA 2733
• MA 2743
• IE 3123
• IE 4613/6613

<table>
<tr><td>IE 6773</td><td>Systems Simulation I</td><td>3</td></tr>
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<tr><td colspan="2">At least one non-HFE ISE course</td><td>3</td></tr>
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</td>
</tr>
</table>

At least one course from Mathematics (MA) or Statistics (ST)	3
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)	3
Total Hours	**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Human Factors and Ergonomics Concentration (HFE) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- IE 3123
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least three HFE ISE courses		9
At least two non-HFE ISE courses		6
At least two courses from Mathematics (MA) or Statistics (ST)		6
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
Total Hours		**30**

A written and oral comprehensive final exam on the

At least one course from Mathematics (MA) or Statistics (ST)	3
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)	3
Total Hours	**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

5. A minimum of 12 hours coursework must be at the 8000-level or higher.
6. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
7. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
8. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Human Factors and Ergonomics Concentration (HFE) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- IE 3123
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least three HFE ISE courses		9
At least two non-HFE ISE courses		6
At least two courses from Mathematics (MA) or Statistics (ST)		6
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
Total Hours		**30**

A written and oral comprehensive final exam on the

coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum.
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
All other courses to be selected by the student along with the academic advisor and graduate program committee		21
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of

coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

4. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
5. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum.
6. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
All other courses to be selected by the student along with the academic advisor and graduate program committee		21
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

5. A minimum of 12 hours coursework must be at the 8000-level or higher.
6. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
7. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
8. No program can contain more than 6 hours of

Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

At least 15 hours of 8000-level courses selected by the student along with the academic advisor and grade program committee.	15
Other courses to be selected by the student along with the academic advisor and grade program committee.	15
Total Hours	**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) – Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited

Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

At least 15 hours of 8000-level courses selected by the student along with the academic advisor and grade program committee.	15
Other courses to be selected by the student along with the academic advisor and grade program committee.	15
Total Hours	**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

4. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
5. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
6. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) – Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited

program or permission frm the MSE Technical Committee
- IE 3913
- IE 4613/6613

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3
IE 8913	Engineering Economy II	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two non-MSE ISE courses		6
Course to be selected by the student along with academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

1. A minimum of 12 hours at the 8000-level is required.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) - Non-Thesis

Prerequisites (foundational courses) are:
- B.S. in engineering from an ABET-accedited program or permission from the MSE Technical Committee
- IE 3913
- IE 4613/6613

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3

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IE 6513	Engineering Administration	3
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IE 8913	Engineering Economy II	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two non-MSE ISE courses		6
Course to be selected by the student along with academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.
Additional requirements are:

5. A minimum of 12 hours at the 8000-level is required.
6. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
7. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
8. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) - Non-Thesis

Prerequisites (foundational courses) are:
- B.S. in engineering from an ABET-accedited program or permission from the MSE Technical Committee
- IE 3913
- IE 4613/6613

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3

IE 8913	Engineering Economy II	3
At least two non-MSE ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) – Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.

IE 8913	Engineering Economy II	3
At least two non-MSE ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

4. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
5. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
6. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) – Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) - Non-Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum

Additional requirements are:

5. A minimum of 12 hours coursework must be at the 8000-level or higher.
6. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
7. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
8. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) - Non-Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

4. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
5. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum

3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) – Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two OR ISE ccourses		6
At least two non-OR ISE courses		6
At least one course from Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) - Non-Thesis

6. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) – Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two OR ISE ccourses		6
At least two non-OR ISE courses		6
At least one course from Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		**30**

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

5. A minimum of 12 hours coursework must be at the 8000-level or higher.
6. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
7. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
8. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
At least two Operations Research ISE courses		6
At least two non-Operations Research ISE courses		6
At least one course com Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
At least two Operations Research ISE courses		6
At least two non-Operations Research ISE courses		6
At least one course com Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

4. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
5. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
6. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Data Analytics Concentration (DAAS) – Thesis

The Data Analytics (DAAS) concentration option is designed for students who wish to advance their careers in data analytics. The industry-relevant curriculum gives students the skills to extract valuable insights from big data. In this program, students will learn expertise in statistical modeling, data management, machine learning, data visualization, and data-driven decision making

related to industrial engineering applications, to meet the growing needs of industry, not-for-profits, government agencies, and other organizations.

Prerequisites (foundational courses) are:

- Calculus 1-4
- IE 4613 Engineering Statistics 1
- MA 3113 Introduction to Linear Algebra
- Computer Programming Proficiency

IE 6623	Engineering Statistics 2	3
IE 6683	Machine Learning with Industrial Engineering Applications	3
IE 8623	Adv Data Analytics	3
At least three ISE elective courses in Data Analytics. See academic advisor for list of approved electives.		9
At least one graduate class from CSE, ECE, or Math/Stat		3
Courses to be selected by the student along with the academic advisor and graduate program committee		3
IE 8000	Thesis in ISE	6
Total Hours		**30**

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Data Analytics Concentration (DAAS) – Non-Thesis

Prerequisites (foundational courses) are:

- Calculus 1-4
- IE 4613 Engineering Statistics 1
- MA 3113 Introduction to Linear Algebra
- Computer Programming Proficiency

IE 6623	Engineering Statistics 2	3
IE 6683	Machine Learning with Industrial Engineering Applications	3
IE 8623	Adv Data Analytics	3
At least three ISE elective courses in Data		9

	Analytics. See academic advisor for list of approved electives.	
	At least one graduate class from CSE, ECE, or Math/Stat	3
	Courses to be selected by the student along with the academic advisor and graduate program committee	9
	Total Hours	**30**

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
See above section – Concentration Description and Curriculum Outline/hours are now combined in the Graduate Catalog; therefore, outline is not repeated here.		See above section – Concentration Description and Curriculum Outline/hours are now combined in the Graduate Catalog; therefore, outline is not repeated here.	

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: Engineering **Department: Electrical and Computer Engineering**

Contact Person: Qian Du **Mail Stop: 9571** **E-mail: du@ece.msstate.edu**
Nature of Change: Ph.D. Admission **Date Initiated: Fall 2021** **Effective Date: Fall 2022**
Current Degree Program Name: Ph.D. in Electrical and Computer Engineering

Major: Electrical and Computer Engineering **Concentration:**

New Degree Program Name:

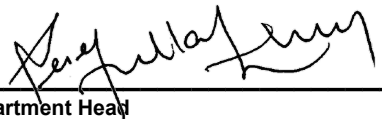
Major: **Concentration:**

Summary of Proposed Changes:

The ECE department proposes modification of the Ph.D. admission criterion as follows:
For students with M.S. degrees, "3.25/4.00 GPA on an M.S. degree for admission to the Ph.D. degree program."

There is no change to the curriculum of the Ph.D. program.

Approved: **Date:**

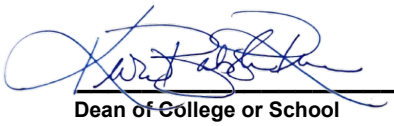


2/28/22

Department Head

3/10/22

Chair, College or School Curriculum Committee



for Jason Keith

3/11/2022

Dean of College or School

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

1. CATALOG DESCRIPTION

CURRENT Catalog Description	PROPOSED Catalog Description
Admission Criteria • 3.00/4.00 GPA on a B.S. degree for admission to the M.S. degree program • 3.50/4.00 GPA on a B.S. or M.S. degree for admission to the Ph.D. degree program	Admission Criteria • 3.00/4.00 GPA on a B.S. degree for admission to the M.S. degree program • 3.25/4.00 GPA on an M.S. degree for admission to the Ph.D. degree program • 3.50/4.00 GPA on a B.S. degree for direct admission to the Ph.D. degree program

2. CURRICULUM OUTLINE

There is no change in the ECE Ph.D. curriculum.

CURRENT Degree Description		PROPOSED Degree Description	
Degree: Ph.D. Major: Electrical and Computer Engineering Concentrations: N/A		Degree: Ph.D. Major: Electrical and Computer Engineering Concentrations: N/A	
The Department of Electrical and Computer Engineering at Mississippi State University offers graduate programs of study leading to Doctor of Philosophy (Ph.D.) degrees in Electrical and Computer Engineering (ECE). The graduate degrees are offered by both on-campus study as well as distance education. These programs prepare graduates for leadership roles in the constantly changing activities of research, development, product design, consulting, and education.		The Department of Electrical and Computer Engineering at Mississippi State University offers graduate programs of study leading to Doctor of Philosophy (Ph.D.) degrees in Electrical and Computer Engineering (ECE). The graduate degrees are offered by both on-campus study as well as distance education. These programs prepare graduates for leadership roles in the constantly changing activities of research, development, product design, consulting, and education.	
"[Click here and type old concentration description]" N/A		"[Click here and type new concentration description]"	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
College Required Courses		College Required Courses	
Major Required Courses Ph.D. in ECE: ECE 8xxx Graduate-level Courses ECE xxxx Additional graduate-level Courses ECE 9000 Dissertation Research Ph.D. in ECE – Direct-Admit: ECE 8xxx Graduate-level Courses ECE xxxx Additional graduate-level Courses ECE 9000 Dissertation Research	 12 12 24 21 21 24	Major Required Courses Ph.D. in ECE: ECE 8xxx Graduate-level Courses ECE xxxx Additional graduate-level Courses ECE 9000 Dissertation Research Ph.D. in ECE – Direct-Admit: ECE 8xxx Graduate-level Courses ECE xxxx Additional graduate-level Courses ECE 9000 Dissertation Research	 12 12 24 21 21 24
Concentration 1. Courses		Concentration 1. Courses	
Concentration 2. Courses		Concentration 2. Courses	
Total Hours		Total Hours	
Ph.D. in ECE Ph.D. in ECE – Direct-Admit	48 66	Ph.D. in ECE Ph.D. in ECE – Direct-Admit	48 66

3. JUSTIFICATION AND STUDENT LEARNING OBJECTIVES

The ECE faculty would like to reduce the GPA requirement from 3.5 to 3.25 on Ph.D. admission for students with M.S. degree. These students usually have research experience, and admission evaluation should be about the overall academic preparation, including publications, recommendation letters, in addition to GPA. Moreover, most of Ph.D. applications are from international students, whose universities may have different curricula and more rigid grading systems. After considering the Ph.D. admission requirements in our peer and peer plus institutes, we think 3.25 GPA in the M.S. program would be a more reasonable threshold which will help us recruit students with great research potentials for their Ph.D. study.

There is no change to learning outcomes with this admission modification.

Expected Outcomes	**Assessment Criteria/Procedures**
1. **Technical knowledge** - Graduates will demonstrate technical knowledge that is broad across Electrical and Computer Engineering and deep in their specific area of study.	**1a. Each student is required to fulfill the Ph.D. qualifier, i.e., earn a 3.5 GPA on the first 18 credit hours of ECE graduate coursework (at least 50% of credit hours must be at 8000-level). The program of study should be approved by the major professor and committee members by the end of the first semester of doctoral enrollment.** **Criterion: At least 90% of full-time graduates pass the Ph.D. qualifier within the first two years of doctoral enrollment.** 1b. Before graduation, each student will orally defend their dissertation to the faculty of their graduate committee. At the dissertation defense, the faculty of the student's graduate committee will complete the ECE Thesis and Dissertation Evaluation Form, a rubric evaluating the areas of technical content and presentation skills on a scale of 1.0 to 5.0. **Criterion:** At least 80% of graduates will achieve an average score of at least 3.0 on a scale of 1.0 to 5.0 on the technical-content portion of the ECE Thesis and Dissertation Defense Evaluation Form.
2. **Communication of advanced-level research** - Graduates will demonstrate ability to communicate advanced-level research that contributes to the profession.	2a. At the time of graduation, each student will complete the ECE Graduation Form, a graduation exit survey; each student will list all papers submitted to or published at technical symposia or conferences during their degree studies on the ECE Graduation Form. **Criterion:** At least 70% of graduates will have published one or more papers at technical symposia or conferences. 2b. At the time of graduation, each student will complete the ECE Graduation Form, a graduation exit survey; each student will list all papers submitted to or published by peer-reviewed journals during their degree studies on the ECE Graduation Form. **Criterion:** At least 70% of graduates will have submitted one or more papers to peer-reviewed journals. 2c. At the time of graduation, each student will complete the ECE Graduation Form, a graduation exit survey; each student will list all presentations made at technical symposia or conferences. **Criterion:** At least 70% of graduates will have presented orally one or more papers at technical symposia or conferences. 2d. Before graduation, each student will orally defend their dissertation to the faculty of their graduate committee. At the dissertation defense, the faculty of the student's graduate committee will complete the ECE Thesis and Dissertation Evaluation Form, a rubric evaluating the areas of technical content and presentation skills on a scale of 1.0 to 5.0. **Criterion:** At least 80% of graduates will achieve an average score of at least 3.0 on a scale of 1.0 to 5.0 on the presentation-skills portion of the ECE Thesis and Dissertation Defense Evaluation Form.
3. **Prepared for professional career -**	3a. At the time of graduation, each student will complete the ECE Graduation Form, a graduation exit survey; each student will indicate their subsequent

Graduates will be readily employable in their professional field.	employment status on the ECE Graduation Form. Students who do not indicate subsequent employment on the ECE Graduation Form will be contacted by the departmental graduate program director the summer after their graduation and asked to complete a post-graduation email survey on employment. **Criterion:** At least 70% of graduates will have garnered employment at the time of graduation or shortly thereafter. 3b. At the time of graduation, each student will complete the ECE Graduation Form, a graduation exit survey; each student will indicate any memberships in professional societies, thereby indicating that they understand the important role that such societies play in introducing new graduates to the professional community as well as in providing resources for lifelong learning and professional development. **Criterion:** At least 70% of graduates will be members of the IEEE or other appropriate professional society.

4. SUPPORT

See attached letter from the departmental Graduate Committee.

5. PROPOSED 4-LETTER ABBREVIATION

ECPE

6. EFFECTIVE DATE

Fall 2022

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

February 28, 2022

To Whom It May Concern:

The Graduate Committee in the Department of Electrical and Computer Engineering (ECE) is in full support of the proposal of reducing the grade point average (GPA) requirement from 3.5 to 3.25 on Ph.D. admission for students with M.S. degree. We considered fourteen peer and peer plus American universities, and found that our current 3.5 M.S. GPA requirement is the highest and 3.25 GPA would be a more reasonable threshold. The students with M.S. degree often have research experience, and their admission evaluation should be about the overall academic record, including publications, recommendation letters, and GPA. In addition, most of Ph.D. applications are from international students, whose universities may have different curricula and more rigid grading systems. We believe this modification will help the ECE department recruit students with great potentials to succeed in their Ph.D. study.

We wish this proposal of modification would be reviewed favorably. If there is any question, please feel free to contact Dr. Qian (Jenny) Du at du@ece.msstate.edu or 662-325-2035.

Sincerely,

The ECE Graduate Committee

Qian Du (Chair) _____

Masoud Karimi _____

Chun-Hung Liu _____

Chaomin Luo _____

Bo Tang _____