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 Affairs **Department:** Data Science

Contact Person: Mimmo Parisi **Mail Stop:** 9545 **E-mail:** parisi@datascience.msstate.edu

Nature of Change: Modification **Date Initiated:** 04/15/2025

Current Degree (BS, MS, etc.): Bachelor of Science

Current Major: Data Science

Current Concentration(s): 10

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

*Gulf Coast campus for Bagley College of Engineering only

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

Effective Date:

Semester	**Year**
Fall	2025

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

Proposed Major: _____

Proposed Concentration(s): _____

Proposed Campus(es)

- ☑ Starkville
- ☐ Meridian
- ☐ Distance
- ☐ Gulf Coast*

*Gulf Coast campus for Bagley College of Engineering only

Summary of Proposed Changes:

This proposal has three parts. (1) Update of existing Marketing and Supply Chain Analytics concentration (2) Creation of new Quantum Computing concentration (3) Creating of new Biomedical Informatics concentration.

Summary of Proposed Updates to the Marketing and Supply Chain Analytics Concentration:

The Data Science concentration in Marketing and Supply Chain Analytics is currently in its second year of operation. It currently has 11 students, which is the second most of any data science concentration. The purpose of this update is to i) account for changed course codes and course names due to Supply Chain Management becoming a major area and splitting from Marketing, ii) give the students more flexibility to take experiential learning live case opportunities, study abroad courses, and independent research studies, iii) balance the concentration by offering more Marketing class options, and iv) deal with minor class scheduling/capacity issues that have caused students issues.

A detailed list of changes is given below.
1. Swap MKT codes for SCL codes in the following classes.

2. SCL 4333 Supply Chain Process Analysis - Change Name (from MKT 4333 International Supply Chain Management) + This is no longer a required capstone course, but is in the list of options for core courses. This class has had capacity issues. The plan is to put BQA 4423 as a capstone (this was previously a required course; we're just moving it around). Having the MKT/SCL courses as the core and then BQA as capstones gives some symmetry (the rationale is that students do the data science labs, pick up MKT /SCL skills, and put things together in the BQA courses that contain data science projects and experiential learning).

3. Added experiential learning live case courses: Given that the data scientists have taken a range of advanced data labs, they can really contribute to these courses, and at the same time, learn business skills from their class colleagues. These courses are as follows:
MKT 4913 Live Case Course in Marketing
SCL 4913 Live Case Course in Supply Chain Logistics

4. Added additional marketing classes: At the moment, there aren't enough classes for students who wish to focus on Marketing Analytics, so I've added similar courses to the ones that we included in the business analytics minor. The following courses have been added:
MKT 3213 Retailing
MKT 4223 Social Media Marketing
MKT 4413 Consumer Behavior

5. Added the option so that students can replace up to two core concentration courses with 3000 or 4000 level MKT or SCL courses with the consent of their advisor . This gives the students more flexibility to take independent research study courses with professors, travel study courses, internship courses, or special topics courses. All these options are regularly offered by our department. In addition, this allows students to take new, innovative courses, and courses in other areas of marketing and supply chain management, for example, advertising and brand management.

Approved: **Date:**

Mimmo Parisi Digitally signed by Mimmo Parisi
Date: 2025.04.22 16:00:10 -05'00'

Department Head

Dana Pomykal Franz, PhD Digitally signed by Dana Pomykal Franz, PhD
Date: 2025.04.22 16:13:51 -05'00'

Director of Academic Quality

Kimberly R. Hall Digitally signed by Kimberly R. Hall
Date: 2025.04.23 09:48:28 -05'00'

Chair, College or School Curriculum Committee

Jamie Dyer Digitally signed by Jamie Dyer
Date: 2025.04.23 14:11:40 -05'00'

Dean of College or School

Chair, University Committee on Courses and Curricula

Chair, Graduate Council (if applicable)

Chair, Deans Council

FOR OIRE USE ONLY

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

OIRE Representative Initials _____

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: Data Science Concentration: 1. Visualization and Visual Analytics for Built Environment 2. Computational Agriculture and Natural Resources 3. Business Information Systems 4. Marketing and Supply Chain Analysis 5. Social Data Analytics 6. Psychoinformatics 7. Statistical Modeling 8. Computational Intelligence 9. Geoinformatics 10. Sports Science	Degree: Bachelor of Science Major: Data Science Concentration: 1. Visualization and Visual Analytics for Built Environment 2. Computational Agriculture and Natural Resources 3. Business Information Systems **4. Marketing and Supply Chain Analysis** 5. Social Data Analytics 6. Psychoinformatics 7. Statistical Modeling 8. Computational Intelligence 9. Geoinformatics 10. Sports Science **11. Biomedical Informatics** **12. Quantum Computing**
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.	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.

CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English (General Education) EN 1103 English Comp I or EN 1104 EN 1113 English Comp II or EN 1173	6	English (General Education) EN 1103 English Comp I or EN 1104 EN 1113 English Comp II or EN 1173	6

Fine Arts (General Education): Any Gen Ed Course	3	Fine Arts (General Education): Any Gen Ed Course	3
Natural Sciences 2 Lab Based Sciences required by Gen Ed	6	Natural Sciences 2 Lab Based Sciences required by Gen Ed	6
Math (General Education): MA 1713 Calculus I MA 1723 Calculus II MA 2733 Calculus III	9	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	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	Social/Behavioral Sciences (Gen Ed): DSCI 2013 Data Science Literacy (required) Any Gen Ed Course	6
Oral Communication CO 3213 Small Group Communication	3	Oral Communication CO 3213 Small Group Communication	3
Technical Writing CO 3223 Comm & Media Studies Research Methods	3	Technical Writing CO 3223 Comm & Media Studies Research Methods	3
Major Core: MA 3123 Statistical Inference MA 3113 Introduction to Linear Algebra MA/ST 4523 Introduction to Probability 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 BIS 3233 Management Information Systems DSCI 3013 Fundamentals of Data Acquisition DSCI 2012 Data Science Lab - Data Wrangling DSCI 3012 Data Science Lab – Description, Analysis, and Inference DSCI 3022 Data Science Lab – Data Visualization DSCI 3032 Data Science Lab - Artificial Intelligence DSCI 2022 Data Science Lab - Cloud, Quantum, and High-Performance	51	Major Core: MA 3123 Statistical Inference MA 3113 Introduction to Linear Algebra MA/ST 4523 Introduction to Probability 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 BIS 3233 Management Information Systems DSCI 3013 Fundamentals of Data Acquisition DSCI 2012 Data Science Lab - Data Wrangling DSCI 3012 Data Science Lab – Description, Analysis, and Inference DSCI 3022 Data Science Lab – Data Visualization DSCI 3032 Data Science Lab - Artificial Intelligence DSCI 2022 Data Science Lab - Cloud, Quantum, and High-Performance	51

Computing DSCI 4013 Data Visualization		Computing DSCI 4013 Data Visualization	
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. **Visualization and Visual Analytics for Built Environment** 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	30	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. **Visualization and Visual Analytics for Built Environment** 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	30

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. <u>Complete EIGHT 3-credit courses out of the following TEN:</u> -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Computational Agriculture and Natural Resources** The Computational Agriculture and Natural Resources (CANR) concentration trains students interested in data-driven		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. <u>Complete EIGHT 3-credit courses out of the following TEN:</u> -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Computational Agriculture and Natural Resources** The Computational Agriculture and Natural Resources (CANR) concentration trains students interested in data-driven careers in	

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. <u>Choose 1 Course from the Following:</u> -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 <u>Choose 1 Course from the Following:</u> -SBP 1103 Introduction to Sustainable Bioproducts -WFA 3133 Applied Ecology -FO 4123 Forest Ecology <u>Choose 6 Credit Hours from the Following:</u> 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		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. <u>Choose 1 Course from the Following:</u> -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 <u>Choose 1 Course from the Following:</u> -SBP 1103 Introduction to Sustainable Bioproducts -WFA 3133 Applied Ecology -FO 4123 Forest Ecology <u>Choose 6 Credit Hours from the Following:</u> 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 2213 Forest Measurements -FO 2443 Essentials of Biotechnology -FO 4113 Forest Resource Economics -FO 4123 Forest Ecology <u>Choose 12 Credit Hours from the Following:</u> 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 -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for		-FO 2443 Essentials of Biotechnology -FO 4113 Forest Resource Economics -FO 4123 Forest Ecology <u>Choose 12 Credit Hours from the Following:</u> 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 -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for	

Bachelor of Science in Data Science **Business Information Systems** 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. <u>Students will choose two courses from the following:</u> -BL 2413 Legal Environment of Business -ACC 2013 Financial Accounting		Bachelor of Science in Data Science **Business Information Systems** 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. <u>Students will choose two courses from the following:</u> -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 <u>Required:</u> -BQA 4423 Business Decision Analysis -BIS 4533 Decision Support Systems -BIS 4113 BIS Security Management -BIS 4753 Structured Systems Analysis and Design -BIS 4763 BIS Senior Seminar (analytics project) -BQA 4413 Business Forecasting & Predictive Analytics Students will register for one 4000 level business elective. Students will register for one non-business course for which they meet the prerequisites from any of the data science concentrations.		-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 <u>Required:</u> -BQA 4423 Business Decision Analysis -BIS 4533 Decision Support Systems -BIS 4113 BIS Security Management -BIS 4753 Structured Systems Analysis and Design -BIS 4763 BIS Senior Seminar (analytics project) -BQA 4413 Business Forecasting & Predictive Analytics Students will register for one 4000 level business elective. Students will register for one non-business course for which they meet the prerequisites from any of the data science concentrations.	
Marketing and Supply Chain Analytics *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 work on projects for*		**Marketing and Supply Chain Analytics** **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.**	

local companies and non-profit organizations. Fundamental Discipline Courses <u>Students will take the following two courses:</u> MKT 3013 Principles of Marketing *MKT* 3323 International Logistics <u>Students will choose one course from the following:</u> 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 <u>*Students will take the following course:*</u> *BQA 4423 Business Decision Analysis* Students will take *three* of the following courses: 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 Breadth Requirement Students will register for one non-business course for which they meet the prerequisites from any of the data science concentrations.		Fundamental Discipline Courses <u>Students will take the following two courses:</u> MKT 3013 Principles of Marketing **SCL** 3323 International Logistics <u>Students will choose one course from the following:</u> 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 <u>Students will choose **four** courses from the following list:</u> BIS 4533 Decision Support Systems **MKT 3213 Retailing** MKT 4533 Marketing Research MKT 4213 Internet Marketing **MKT 4223 Social Media Marketing** **MKT 4413 Consumer Behavior** **MKT 4913 Live Case Course in Marketing** **SCL** 4033 International Transportation **SCL** 4013 Procurement **SCL** 4313 Physical Distribution Management **SCL 4333 Supply Chain Process Analysis** **SCL 4913 Live Case Course in Supply Chain Logistics** ***Students can replace up to two core concentration courses with 3000 or 4000 level MKT or SCL courses not listed above with the consent of their advisor.** Breadth Requirement Students will register for one non-business course for which they meet the prerequisites from any of the data science concentrations.	

Capstone <u>Students will register for two of the following courses:</u> *MKT 4333 International Supply Chain Management* BQA 4413 Business Forecasting & Predictive Analytics BQA 4000 Directed Individual Study in Business Quantitative Analysis **Social Data Analytics** 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. <u>From the following courses, choose 9 hours, but no more than 6 hours in any one field:</u> -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 <u>Choose 15 hours from the following 3-hour courses:</u> -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		Capstone <u>Students will register for two of the following courses:</u> BQA 4413 Business Forecasting & Predictive Analytics **BQA 4423 Business Decision Analysis** BQA 4000 Directed Individual Study in Business Quantitative Analysis **Social Data Analytics** 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. <u>From the following courses, choose 9 hours, but no more than 6 hours in any one field:</u> -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 <u>Choose 15 hours from the following 3-hour courses:</u> -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science		-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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	
Psychoinformatics Psychoinformatics is a 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. Psychoinformatics 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. <u>Required:</u>		**Psychoinformatics** Psychoinformatics is a 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. Psychoinformatics 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. <u>Required:</u>	

-PSY 1021 Careers in Psychology -PSY 3104 Introductory Psychological Stats -PSY 3314 Experimental Psychology <u>Choose 9 hours from the following 3-hour courses:</u> -PSY 3343 Psychology of Learning -PSY 3623 Social Psychology -PSY 3713 Cognitive Psychology -PSY 3803 Intro to Developmental Psych -PSY 4403 Biological Psychology <u>Choose 6 hours from among any of the 4000 level Psychology courses.</u> <u>Required:</u> -PSY 4000 Directed Individual Study in Psychology *Students must perform research in a laboratory and present their capstone project at the Undergraduate Research Symposium.*		-PSY 1021 Careers in Psychology -PSY 3104 Introductory Psychological Stats -PSY 3314 Experimental Psychology <u>Choose 9 hours from the following 3-hour courses:</u> -PSY 3343 Psychology of Learning -PSY 3623 Social Psychology -PSY 3713 Cognitive Psychology -PSY 3803 Intro to Developmental Psych -PSY 4403 Biological Psychology <u>Choose 6 hours from among any of the 4000 level Psychology courses.</u> <u>Required:</u> -PSY 4000 Directed Individual Study in Psychology *Students must perform research in a laboratory and present their capstone project at the Undergraduate Research Symposium.*	
Statistical Modeling 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. <u>Required:</u> -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 -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science		**Statistical Modeling** 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. <u>Required:</u> -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 -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science	

-DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Computational Intelligence** 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. <u>Required:</u> -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 -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Geoinformatics** 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		-DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Computational Intelligence** 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. <u>Required:</u> -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 -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science **Geoinformatics** 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	

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. <u>Required:</u> -GR 4303 Principles of GIS2 -GR 4633 Statistical Climatology <u>Choose one of the following:</u> -GR 4333 Remote Sensing of the Physical Environment2 -GR 4783 Satellite Meteorology -GR 4883 Radar Meteorology <u>Elective courses (15 hours – choose 5 from the following)</u> -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 Meteorology1 -GR 4883 Radar Meteorology1 •-GR 4553 Computer Methods in Meteorology -GR 4313 Advanced GIS2 -GR 4323 Cartographic Sciences2		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. <u>Required:</u> -GR 4303 Principles of GIS2 -GR 4633 Statistical Climatology <u>Choose one of the following:</u> -GR 4333 Remote Sensing of the Physical Environment2 -GR 4783 Satellite Meteorology -GR 4883 Radar Meteorology <u>Elective courses (15 hours – choose 5 from the following)</u> -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 Meteorology1 -GR 4883 Radar Meteorology1 •-GR 4553 Computer Methods in Meteorology -GR 4313 Advanced GIS2 -GR 4323 Cartographic Sciences2	

-GR 4333 Remote Sensing of the Physical Environment1,2 -GR 4343 Advanced Remote Sensing2 -GR 4363 GIS Programming2 -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 <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science		-GR 4333 Remote Sensing of the Physical Environment1,2 -GR 4343 Advanced Remote Sensing2 -GR 4363 GIS Programming2 -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* <u>Required:</u> -DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science -DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science	
Sports Science The Sports Science concentration focuses on applying data science to understand the physiological and neuromechanical stresses on athletes. Students will apply data science techniques with foundational exercise science knowledge to assess physiological and neuromechanical variables and then interpret findings to improve training and performance. Students completing the Sports Science concentration will be prepared for careers working with individuals in a wide variety of sport and performance settings. <u>Required:</u> -BIO 1004: Anatomy and Physiology** -EP 3233: Anatomical Kinesiology -EP 3304: Exercise Physiology -EP 4504: Mechanical Analysis Human Performance Emphasis <u>Choose one of the following:</u> -PE 3163: Sport Psychology -SS 4003: Sport Philosophy <u>Required:</u> -PE 4283: Sport Biomechanics		**Sports Science** The Sports Science concentration focuses on applying data science to understand the physiological and neuromechanical stresses on athletes. Students will apply data science techniques with foundational exercise science knowledge to assess physiological and neuromechanical variables and then interpret findings to improve training and performance. Students completing the Sports Science concentration will be prepared for careers working with individuals in a wide variety of sport and performance settings. <u>Required:</u> -BIO 1004: Anatomy and Physiology** -EP 3233: Anatomical Kinesiology -EP 3304: Exercise Physiology -EP 4504: Mechanical Analysis Human Performance Emphasis <u>Choose one of the following:</u> -PE 3163: Sport Psychology -SS 4003: Sport Philosophy <u>Required:</u> -PE 4283: Sport Biomechanics	

-PE 3313: Sport Physiology -EP 4153: Training and Cond for Sport * -DSCI 4663: Data Science Capstone 2 * Serves as requirement for DSCI 4553 Data Science Capstone 1 ** If taken as a general education credit, an additional Sports Science course will be added.		-PE 3313: Sport Physiology -EP 4153: Training and Cond for Sport * -DSCI 4663: Data Science Capstone 2 * Serves as requirement for DSCI 4553 Data Science Capstone 1 ** If taken as a general education credit, an additional Sports Science course will be added. **Biomedical Informatics** **The Biomedical Informatics concentration focuses on applying data science to analyze biological systems, medical signals, and health data. Students will integrate computational problem-solving, biomedical signal processing, and machine learning to extract meaningful insights from physiological and molecular data. By combining principles of biomedicine, computational biology, and public health, students will develop the skills to model biological systems, interpret biomedical signals, and contribute to advancements in healthcare technology. Graduates of this concentration will be prepared for careers in biomedical data analysis, healthcare technology development, and research in computational and systems biology.** **<u>Required:</u>** **-ABE 4633 Biomedical Signals and Sensors** **-ABE 4463 Introduction to Imaging in Biological Systems** **-BCH 4443 Introduction to Public Health** **-ABE 4323 Physiological Systems in Biomedical Engineering** **-DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science** **-DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science** **Biomedical Modeling** **<u>Choose 1 of the following</u>:** **-CSE 4683 Machine Learning and Soft Computing** **-CSE 4623 Computational Biology** **-MA 4343 Mathematical Modeling with Biological and Ecological Applications**	

		-BIO 4124 Mathematical Modeling for Biologists **Biomedical Systems and Diagnostics** **<u>Choose 1 of the following:</u>** **-ABE 4443 Spectroscopic Sensing in Biosystems** **-EP 3613 Exercise Electrocardiography** **-ABE 1912 Computational Problem Solving for Biological Systems** **Biomedicine and Health Applications** **<u>Choose 2 of the following:</u>** **-FNH 3103 Introduction to Health Professions** **-CSE/PSY 4653 Cognitive Science** **-BCH 2013 Intro to Forensic Science** **-BCH 4113 Essentials of Molecular Genetics** **Quantum Computing** **Quantum computing, a new paradigm for computing that depends upon the quantum properties of reality, holds great promise for applications to data science including cryptography, deep learning, and simulation. Fundamental physics courses provide a discipline-specific foundation for quantum theory. Core concentration courses prepare students to understand and work with quantum computing, an inherently statistical approach to computational problem solving. Students who complete the concentration will possess not only a firm foundation in classical computing from the Data Science program as a whole, but will be ready to engage quantum computing as the next generation of enabling technologies for exciting applications such as AI.** **<u>Required:</u>** **-PH 1001 Intro to Physics** **-PH 2213 Physics I** **-PH 3613 Modern Physics** **-MA 2743 Calculus IV** **-MA 3253 Differential Equations I** **-PH 4713 Intro to Quantum Principles** **-PH 4163/6163 Foundations of Quantum Computing**	

		-DSCI 4553: Capstone Project 1 for Bachelor of Science in Data Science **-DSCI 4663: Capstone Project 2 for Bachelor of Science in Data Science** **Students will then choose from 2 pathways.** **Pathway 1:** **<u>Required Courses</u>** **-PH 4152 Modern Physics Lab** **-PH 4143 Intermed Laboratory** **Pathway 2:** **<u>Choose two courses from the list below:</u>** **-PH 3063 Astrophysics** **-PH 4413 Thermal Physics** **-PH 4813 Solid State Physics** **-PH 4323 Electromag Fields I** **-PH 4213 Intermediate Mechanics I** **-PH 4113 Electric Circuit Science** **-PH 4433 Computational Physics** **-PH 4513 Optics** **-PH 1063 Descriptive Astronomy** **-PH 4613 Nuclear Particle Physics** **-PH 4723 App of Quantum Mech** **-PH 4990 Special Topics**	
Total Hours	123	Total Hours	123

Concentration Coursework

JUSTIFICATIONS

The addition of the Biomedical Informatics concentration enhances the data science program by addressing the growing intersection of computational methods and healthcare. With the increasing reliance on biomedical data for diagnostics, treatment planning, and public health decision-making, this concentration equips students with the necessary skills to analyze complex biological systems, interpret medical signals, and apply machine learning to healthcare challenges. Students will benefit from a well-rounded curriculum that integrates computational problem-solving, biomedical signal processing, and biological modeling, preparing them for diverse career opportunities in healthcare technology, biomedical research, and public health analytics. This concentration strengthens the program by broadening its interdisciplinary reach, attracting students interested in applying data science to life sciences, and meeting the rising industry demand for professionals with expertise in biomedical data analysis and informatics.

Quantum computing offers a potentially transformational way to perform computation. As it is an emerging area that is experiencing great growth, students may find it an attractive area to specialize in. Career opportunities in quantum computing include programming quantum hardware that has only recently become available, developing quantum computing algorithms, and developing new quantum computing hardware. This concentration adds additional mathematics and physics courses that are necessary for students to understand the fundamentals of quantum mechanics and its application in quantum computing. Some elective choice in upper level physics courses is also provided, which allows students to choose courses most appropriate for their interests.

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 for all three proposals
PROPOSED 4-LETTER ABBREVIATION DSCI
EFFECTIVE DATE Fall 2025
CIP NIMBER 30.7001

MEMO:

To: UCCC Chair

MISSISSIPPI STATE UNIVERSITY
MARKETING, QUANTITATIVE ANALYSIS AND BUSINESS LAW

From: Robert Moore, Chair, Department Curriculum Committee

Date: April 2, 2025
Re: Letter of Support for Department Name Change

The Department faculty have reviewed the proposed Modification of the Marketing and Supply Chain Analytics Degree. Modification reflects SCL course code designation, adding options to required and capstone courses. In lieu of signing, an email statement of support/non-support/abstention is acceptable.

Faculty	Support	Do Not Support	Signature (note if abstaining)	Date
Dr. Frank Adams	✓			2 Apr 25
Dr. Iva Ballard	✓		Iva B. Ballard	04/02/2025
Dr. Chris Boone	✓			2 Apr 25
Dr. Mike Breazeale	✓			4/2/25
~~Haley Brown, JD~~			BLAW FACULTY	not needed
Dr. Joel Collier	✓			4-7-25
Dr. Shelby Dudgeon	✓		Shelby Dudgeon	04/04/25
Dr. Stephen France	✓			4/8/2025
Dr. Lu He	✓			4/2/2025
Dr. Bingyan Hu	✓			4-2-25
Dr. Myles Landers	✓			4-7-25
Dr. Jason Lueg			ABSTAIN	4/2/25
~~Stephanie Mallette, JD~~			BLAW FACULTY	not needed
Dr. Robert Moore	✓			4.2.25
Dr. Melissa Moore	✓			4-2-25
Dr. Sheida Riahi	✓		Sheida Riahi	4-3-25
Dr. Kevin Shanahan	✓			4-6-25

Faculty	Support	Do Not Support	Signature	Date
Dr. Jason Shin	☑	☐		4/3/25
Ms. Emily Stokes	☒	☐	Emily St	4/3/25
Dr. Keith Story	☐	☐		
Dr. Laura Walton	☐	☐		
Dr. Eric Xu	☒	☐	See Attached	
Dr. Yueran Zhuo	☒	☐	See attached	

Moore, Robert

From: Xu, Eric
Sent: Thursday, April 3, 2025 2:10 AM
To: Moore, Robert
Subject: Re: Letter of Support for Modification to Data Science: Marketing and Supply Chain Analytics Concentration Degree

Hi Rob,

I support these modifications.

Best regards,
Eric

From: Moore, Robert <RMoore@business.msstate.edu>
Sent: Wednesday, April 2, 2025 12:34 PM
To: Adams, Frank <fadams@business.msstate.edu>; Ballard, Iva <IBallard@business.msstate.edu>; Boone, Christopher <cboone@business.msstate.edu>; Breazeale, Mike <mbreazeale@business.msstate.edu>; Collier, Joel <JCollier@business.msstate.edu>; Dudgeon, Shelby <SDudgeon@business.msstate.edu>; France, Stephen <sfrance@business.msstate.edu>; He, Lu <lhe@business.msstate.edu>; Hu, Bingyan <bhu@business.msstate.edu>; Landers, Myles <vlanders@business.msstate.edu>; Lueg, Jason <JLueg@business.msstate.edu>; Moore, Melissa <mmoore@business.msstate.edu>; Riahi, Sheida <sr1315@msstate.edu>; Shanahan, Kevin <KShanahan@business.msstate.edu>; Shin, Jason <jshin@business.msstate.edu>; Stokes, Emily <ekd47@msstate.edu>; Story, Keith <kstory@business.msstate.edu>; Walton, Laura <LWalton@business.msstate.edu>; Xu, Eric <exu@business.msstate.edu>; Zhuo, Yueran <yzhuo@business.msstate.edu>
Subject: Letter of Support for Modification to Data Science: Marketing and Supply Chain Analytics Concentration Degree

Greetings,

We are in the process of making a Modification to Data Science: Marketing and Supply Chain Analytics Concentration Degree
I have a letter of support/non support/absetention for this change for your consideration in the copy room.

If you could, provide your vote by Thursday APR 10th.

The proposed modification will reflect:
A detailed list of changes is given below.
1. Swap MKT codes for SCL codes.
2. **SCL 4333 Supply Chain Process Analysis** - Change Name + This is no longer a required capstone course, but is in the list of options for core courses.
3. Added **BQA 4423 Business Decision Analysis** as a capstone option.
3. Added marketing and experiential learning live case courses options:
MKT 3213 Retailing
MKT 4223 Social Media Marketing
MKT 4413 Consumer Behavior
MKT 4913 Live Case Course in Marketing
SCL 4333 Supply Chain Process Analysis
SCL 4913 Live Case Course in Supply Chain Logistics
***Students can replace up to two courses with MKT or SCL courses not listed above, with the consent of their advisor.**

Moore, Robert

From: Zhuo, Yueran
Sent: Wednesday, April 2, 2025 12:47 PM
To: Moore, Robert
Subject: Re: Letter of Support for Modification to Data Science: Marketing and Supply Chain Analytics Concentration Degree

Dear Rob,

Please kindly consider this email as my statement of support to the modification to this program. Thank you for your hard work!

Best
Yueran

On Apr 2, 2025, at 12:34 PM, Moore, Robert <RMoore@business.msstate.edu> wrote:

Greetings,

We are in the process of making a Modification to Data Science: Marketing and Supply Chain Analytics Concentration Degree
I have a letter of support/non support/absetention for this change for your consideration in the copy room.

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1. Swap MKT codes for SCL codes.
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3. Added **BQA 4423 Business Decision Analysis** as a capstone option.
3. Added marketing and experiential learning live case courses options:
MKT 3213 Retailing
MKT 4223 Social Media Marketing
MKT 4413 Consumer Behavior
MKT 4913 Live Case Course in Marketing
SCL 4333 Supply Chain Process Analysis
SCL 4913 Live Case Course in Supply Chain Logistics
***Students can replace up to two courses with MKT or SCL courses not listed above, with the consent of their advisor.**

In lieu of signing, an email statement of support/non-support/abstention is acceptable.

Rob

Robert S. Moore, Ph.D.

MISSISSIPPI STATE UNIVERSITY

DATA SCIENCE
133 Etheredge Hall
Mississippi State, MS 39762

P. 662.325.3168

April 17, 2025

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 modification of the Marketing and Supply Chain Analytics concentration for the BS in Data Science.

Sincerely,

The following undersigned members of the University Committee on Data Science

Dan Gadke, UDSC Chair
Approve: [X] Disapprove: [ ]

Bimal Balakrishnan
Approve: [X] Disapprove: [ ]

Jonathan Barlow
Approve: [X] Disapprove: [ ]

Will Davis
Approve: [X] Disapprove: [ ]

Stephen France
Approve: [X] Disapprove: [ ]

Mahdi Ghafoori
Approve: [X] Disapprove: [ ]

Federico Hoffmann
Approve: [X] Disapprove: [ ]

Shane Miller
Approve: [ ] Disapprove: [ ]

Bindu Nanduri
Approve: [ ] Disapprove: [ ]

Sean Owen
Approve: [X] Disapprove: [ ]

Mimmo Parisi
Approve: [X] Disapprove: [ ]

Andy Perkins
Approve: [ ] Disapprove: [ ]

Kim Hall, Curriculum Subcommittee Chair
Approve: [X] Disapprove: [ ]

Mohammad Sepehrifar
Approve: [X] Disapprove: [ ]

Julie Shedd
Approve: [X] Disapprove: [ ]

Seungjae Shin Digitally signed by Seungjae Shin Date: 2025.02.27 11:23:34 -05'00'

Seungjae Shin
Approve: [X] Disapprove: [ ]

Carolina Siniscalchi
Approve: [X] Disapprove: [ ]

Jason Street
Approve: [X] Disapprove: [ ]

Ed Swan
Approve: [X] Disapprove: [ ]

Hasan Tekedar
Approve: [X] Disapprove: [ ]

Ryan Walker
Approve: [ ] Disapprove: [ ]

Guiming Wang
Approve: [X] Disapprove: [ ]

Merrill Warkentin
Approve: [X] Disapprove: [ ]

MISSISSIPPI STATE UNIVERSITY

DATA SCIENCE
133 Etheredge Hall
Mississippi State, MS 39762

P. 662.325.3168

April 17, 2025

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 Biomedical Informatics concentration for the BS in Data Science.

Sincerely,

The following undersigned members of the University Committee on Data Science

Dan Gadke, UDSC Chair
Approve: [X] Disapprove: [ ]

Bimal Balakrishnan
Approve: [X] Disapprove: [ ]

Jonathan Barlow
Approve: [X] Disapprove: [ ]

Will Davis
Approve: [X] Disapprove: [ ]

Stephen France
Approve: [X] Disapprove: [ ]

Mahdi Ghafoori
Approve: [X] Disapprove: [ ]

Federico Hoffmann
Approve: [X] Disapprove: [ ]

Shane Miller
Approve: [ ] Disapprove: [ ]

Bindu Nanduri
Approve: [ ] Disapprove: [ ]

Sean Owen
Approve: [X] Disapprove: [ ]

Mimmo Parisi
Approve: [X] Disapprove: [ ]

Andy Perkins
Approve: [ ] Disapprove: [ ]

Kim Hall, Curriculum Subcommittee Chair
Approve: [X] Disapprove: [ ]

Mohammad Sepehrifar
Approve: [X] Disapprove: [ ]

Julie Shedd
Approve: [X] Disapprove: [ ]

Seungjae Shin Digitally signed by Seungjae Shin Date: 2025.02.27 11:23:34 -05'00'

Seungjae Shin
Approve: [X] Disapprove: [ ]

Carolina Siniscalchi
Approve: [X] Disapprove: [ ]

Jason Street
Approve: [X] Disapprove: [ ]

Ed Swan
Approve: [X] Disapprove: [ ]

Hasan Tekedar
Approve: [X] Disapprove: [ ]

Ryan Walker
Approve: [ ] Disapprove: [ ]

Guiming Wang
Approve: [X] Disapprove: [ ]

Merrill Warkentin
Approve: [X] Disapprove: [ ]

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING
P. O. Box 9632
Mississippi State, MS 39762
P. 662.325.3282
abe.msstate.edu

November 26, 2024

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

Dear Dr. Perkins,

The Department of Agricultural and Biological Engineering would like to offer a new concentration in Biomedical Informatics as part of the Bachelor of Science in Data Science. This concentration would be a great addition to the data science efforts across the university for all undergraduate students. This letter is to indicate ABE faculty have reviewed and approved the requested concentration.

Amirtaha Taebi Digitally signed by Amirtaha Taebi Date: 2024.12.06 13:46:32 -06'00'

Amirtaha Taebi, Ph.D.

J. Alex Thomasson Digitally signed by J. Alex Thomasson Date: 2024.12.08 09:16:14 -06'00'

J. Alex Thomasson, Department Head

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING
P. O. Box 9632
Mississippi State, MS 39762
P. 662.325.3282
abe.msstate.edu

Dong Chen, Ph.D.	Dong Chen	Digitally signed by Dong Chen Date: 2024.12.03 18:50:15 +08'00'
Daniel Chesser, Ph.D.	Gary D. Chesser, Jr.	Digitally signed by Gary D. Chesser, Jr. Date: 2024.12.02 10:07:30 -06'00'
Steven H. Elder, Ph.D.		Digitally signed by Steve Elder Date: 2024.12.02 09:43:02 -06'00'
John Wes Lowe, Ph.D.		
Hussein Gharakhani, Ph.D.	Hussein Gharakhani	Digitally signed by Hussein Gharakhani Date: 2024.11.26 15:08:11 -06'00'
Seungil Kim, Ph.D.	Seungil Kim	Digitally signed by Seungil Kim Date: 2024.11.26 15:28:43 -06'00'
Vitor Souza Martins, Ph.D.	Vitor Martins	Digitally signed by Vitor Martins Date: 2024.11.26 15:34:56 -06'00'
Prem Parajuli, Ph.D.	Prem Parajuli	Digitally signed by Prem Parajuli Date: 2024.12.03 06:59:20 -06'00'
Joel O. Paz, Ph.D.		Digitally signed by Joel O. Paz Date: 2024.12.03 09:00:01 -06'00'
Lauren B. Priddy, Ph.D.	Lauren Priddy	Digitally signed by Lauren Priddy Date: 2024.12.03 09:16:24 -06'00'
Maryam Mohammadi-Aragh, Ph.D.	Maryam Mohammadi-Aragh	Digitally signed by Maryam Mohammadi-Aragh Date: 2024.12.03 13:08:38 -06'00'
Mary Love M. Tagert, Ph.D.		Digitally signed by Mary Love Tagert Date: 2024.12.03 15:17:49 -06'00'
S.D. Filip To, Ph.D.	647e9ab1-eae4-49e0-afcf-12facb38470d	Digitally signed by 647e9ab1-eae4-49e0-afcf-12facb38470d Date: 2024.12.06 13:06:12 -06'00'
David Van Den Heever, Ph.D.	David Vandenheever	Digitally signed by David Vandenheever Date: 2024.12.06 13:33:02 -06'00'
Nuwan Wijewardane, Ph.D.	Nuwan K. Wijewardane	Digitally signed by Nuwan K. Wijewardane Date: 2024.12.06 13:36:34 -06'00'
Fei Yu, Ph.D.	Fei Yu	Digitally signed by Fei Yu Date: 2024.12.06 13:39:02 -06'00'
Xin Zhang, Ph.D.	Xin Zhang	Digitally signed by Xin Zhang Date: 2024.12.06 13:42:39 -06'00'

MISSISSIPPI STATE UNIVERSITY
COLLEGE OF AGRICULTURE & LIFE SCIENCES
MS AGRICULTURAL & FORESTRY EXPERIMENT STATION
Office of the Dean and Director
Box 9760
Mississippi State, MS 39762

March 26, 2025

Dr. Andy Perkins, Chair
University Committee on Courses and Curricula
Mississippi State University

Dear Dr. Perkins:

The College of Agriculture and Life Sciences is pleased to support the addition of the concentration in Biomedical Informatics to the current Bachelor of Science in Data Science degree. Undoubtedly, there is interest among MSU students in this topic, and this new program will provide a unique blend of courses that will make our students more well-rounded and informed. Please let me know if you have any questions or concerns.

Regards,

Darrell L. Sparks, Jr., Ph.D.
Associate Dean & Professor
College Agriculture and Life Sciences
Mississippi State University
Box 9760
Mississippi State, MS 39762
darrell.sparks@msstate.edu
Office: 662-325-5307

MISSISSIPPI STATE UNIVERSITY™
JAMES WORTH
BAGLEY
COLLEGE OF ENGINEERING

OFFICE OF THE
DEAN OF ENGINEERING

Robert A. Green, Ph.D. P.E., F.NSPE
Interim Dean
green@bagley.msstate.edu

25 March 2025

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

Dear Dr. Perkins,

The Bagley College of Engineering is supportive of the proposed concentration in Biomedical Informatics as part of the Bachelor of Science in Data Science as being submitted by the Agricultural and Biological Engineering Department.

Sincerely,

Robert A. Green

Robert A. Green, Ph.D., P.E., F.NSPE
Interim Dean

MISSISSIPPI STATE UNIVERSITY™

DATA SCIENCE ACADEMIC INSTITUTE
133 Etheredge Hall
Mississippi State, MS 39762
662.325.3168
datascience.msstate.edu

February 24, 2025

To: UCCC Committee Members

From: Mimmo Parisi
Executive Director
Data Science Academic Institute

The Data Science Academic Institute supports the inclusion of the following two courses within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration. This concentration will be hosted by the Department of Ag and Bio Engineering.

DSCI 4553 Data Science Senior Capstone I
DSCI 4663 Data Science Senior Capstone II

Sincerely,

Mimmo Parisi

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF ARTS & SCIENCES
DEPARTMENT OF BIOLOGICAL SCIENCES

P.O. Box GY
295 E Lee Blvd
Mississippi State, MS 39762

P. 662.325.3120
F. 662.325.7939
www.biology.msstate.edu

February 14, 2025

To whom it may concern:

The Department of Biological Sciences is submitting this letter in support of the addition of a concentration in Biomedical Informatics for the Bachelor of Science in Data Science degree program, and the inclusion of BIO 4124 Mathematical Modeling for Biologists in this proposed curriculum option. This course is a general elective option for our students and will continue to be offered regularly for the foreseeable future with sufficient seats to accommodate our own students and any additional. We do not anticipate that what enrollment increases arise from inclusion in this new track will affect the availability of this course for other students or the way we offer it. We are happy to help provide a new pathway for Data Science students that provides options as they consider their future career goals.

Sincerely,

Angus Dawe

Digitally signed by Angus Dawe
Date: 2025.02.14 11:05:27 -06'00'

Angus L. Dawe, Ph.D.
Professor
Department Head

Evan L. Kaplan
2025.02.14 16:13:43 -06'00'

Evan Kaplan, Ph.D.
Assistant Teaching Professor
Chair, Biological Sciences Curriculum Committee

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

February 10, 2025

Dr. Perkins,

To Whom It May Concern,

The faculty of the Computer Science and Engineering (CSE) department has officially approved adding the following courses to the Bachelor of Science (BS) in Data Science (Biomedical Informatics concentration) program:

- CSE 4663 Human-Computer Interaction
- CSE 4623 Computational Biology
- CSE 4683 Machine Learning and Soft Computing.

Please feel free to contact me if you have any questions or concerns.

Stephen A. Torri
Committee Chair
Associate Professor

Jingdao Chen, Ph.D.
Committee Member
Assistant Professor

Kortni Neal
Committee Member
Instructor

Joshua Crowson
Committee Member
Instructor

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF BIOCHEMISTRY, NUTRITION,
AND HEALTH PROMOTION
P. O. Box 9655
Mississippi State, MS 39762
P. 662.325.2640
bchnhp.msstate.edu

February 12, 2025

Dr. Mimmo Parisi
Executive Director
Data Science Academic Institute
Mailstop 9545
133 Etheredge Hall
Mississippi State, MS 39762

Re: **Letter of Support for Data Science Concentration in Biomedical Informatics**

Dear Dr. Parisi,

I am pleased to write this letter in support of the Data Science concentration in Biomedical Informatics. The Department of Biochemistry, Nutrition & Health Promotion (BCHNHP) sees the Data Science Biomedical Informatics concentration as a positive for MSU and BCHNHP. Of note, the BCHNHP faculty are pleased that six of their courses will be included in the elective list for the concentration. These courses are…

- BCH 4443 – Intro to Public Health
- BCH 4013 – Principles of Biochemistry
- BCH 4113 – Essentials of Molecular Genetics
- BCH 2013 – Intro to Forensic Science
- BCH 4333 – Advanced Forensic Science
- FNH 3103 – Intro to Health Professions

Please feel free to contact me if you have any questions.

Sincerely,

Daniel G. Peterson, Ph.D.
William L. Giles Distinguished Professor
Interim Head
Department of Biochemistry, Nutrition & Health Promotion

MISSISSIPPI STATE
UNIVERSITY™

College of Arts and Sciences
Department of Mathematics and Statistics

P.O. Box MA
Mississippi State, MS 39762

P. 662.325.3414
F. 662.325.0005
www.math.msstate.edu

To Whom it may concern,

The Department of Agriculture and Biological Engineering is adding a biomedical concentration to their data science program. The department wishes to add the course MA 4343: Mathematical Modeling with Biological and Ecological Applications.

The Department of Mathematics and Statistics supports the inclusion of course MA 4343 within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration which will be hosted by the Department of Agriculture and Biological Engineering. The Courses and Curriculum Committee at the department level, the entity writing this letter, is in full support.

Sincerely,

Dr. Matt McBride
Associate Professor and Undergraduate Coordinator
Department of Mathematics and Statistics
Mississippi State University

Dr. Mohammad Sepehrifar
Associate Professor
Department of Mathematics and Statistics
Mississippi State University

Mohsen Razzaghi

Digitally signed by Mohsen Razzaghi
DN: cn=Mohsen Razzaghi, o=Mississippi State University, ou=Mathematics and Statistics, email=razzaghi@math.msstate.edu, c=US
Date: 2025.02.18 09:35:30 -06'00'

Dr. Mohsen Razzaghi
Professor and Department Head
Department of Mathematics and Statistics
Mississippi State University

Chuanxi Qian

Dr. Chuanxi Qian
Professor
Department of Mathematics and Statistics
Mississippi State University

Dr. Jon Woody
Associate Professor
Department of Mathematics and Statistics
Mississippi State University

Robert Banik

Mr. Robert Banik
Instructor and Undergraduate Advising Coordinator
Department of Mathematics and Statistics
Mississippi State University

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF KINESIOLOGY
P.O. Box 6186
216 McCarthy Gym
Mississippi State, MS 39762

P. 662.325.2963
F. 662.325.4525
www.kinesiology.msstate.edu

January 17th, 2025

TO: UCCC Committee Members

FROM: JohnEric Smith, Ph.D. (Department Head for the Department of Kinesiology)

RE: Department of Kinesiology the inclusion of course EP 3613 Exercise Electrocardiography within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration (Page 1 of 2).

The Department of Kinesiology supports the inclusion of course EP 3613 Exercise Electrocardiography within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration which will be hosted by the Department of Ag and Bio Engineering. The Courses and Curriculum Committee at the department level, the entity writing this letter, is in full support.

Sincerely,

JohnEric Smith, PhD

As indicated by the signatures below, a majority of the Department of Kinesiology faculty have approved the proposal as written for submission to the UCCC.

Stamatis Agiovlasitis, PhD

LeeAnn Joe

Zachary M. Gillen, PhD

Adam Knight, PhD

Erin Grant-Butler

John Lamberth, PhD

Megan E. Holmes, PhD

Guillermo Oviedo, PhD

Page 2 of 2: Continuation of Department of Kinesiology the inclusion of course EP 3613 Exercise Electrocardiography within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration (Page 2 of 2).

Zhujun Pan, PhD

Benjamin Wax, PhD

Holley Gentry Wiley, PhD

MISSISSIPPI STATE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
Department of Psychology
P.O. Box 6161
180 Magruder Street
Mississippi State, MS 39762
P. 662.325.3202
F. 662.325.7212
www.psychology.msstate.edu

March 5, 2025

Members of the UCCC:

The Department of Psychology supports the inclusion of PSY/CSE 4653 Cognitive Science within the curriculum for the proposed Bachelor of Science in Data Science, Biomedical Informatics concentration which will be hosted by the Department of Ag and Bio Engineering. The department's undergraduate curriculum has reviewed the proposed curriculum and approves of the inclusion of PSY/CSE 4653.

Sincerely,

The Psychology Undergraduate Committee

Danielle K. Nadorff, Phd.

Digitally signed by Danielle K. Nadorff, Ph.D.
Date: 2025.03.05 16:12:22 -06'00'

Danielle Nadorff, Ph.D. (Committee chair)

Allison Jaeger

Digitally signed by Allison Jaeger
Date: 2025.03.05 16:15:15 -06'00'

Allison Jaeger Berena, Ph.D. (Committee member)

3-6-25

Jonathan Black, M.S. (Committee member)

MISSISSIPPI STATE UNIVERSITY

DATA SCIENCE
133 Etheredge Hall
Mississippi State, MS 39762

P. 662.325.3168

April 17, 2025

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 Quantum Computing concentration for the BS in Data Science.

Sincerely,

The following undersigned members of the University Committee on Data Science

Dan Gadke, UDSC Chair
Approve: [X] Disapprove: [ ]

Bimal Balakrishnan
Approve: [X] Disapprove: [ ]

Jonathan Barlow
Approve: [X] Disapprove: [ ]

Will Davis
Approve: [X] Disapprove: [ ]

Stephen France
Approve: [X] Disapprove: [ ]

Mahdi Ghafoori
Approve: [X] Disapprove: [ ]

Federico Hoffmann
Approve: [X] Disapprove: [ ]

Shane Miller
Approve: [ ] Disapprove: [ ]

Bindu Nanduri
Approve: [ ] Disapprove: [ ]

Sean Owen
Approve: [X] Disapprove: [ ]

Mimmo Parisi
Approve: [X] Disapprove: [ ]

Andy Perkins
Approve: [ ] Disapprove: [ ]

Kim Hall, Curriculum Subcommittee Chair
Approve: [X] Disapprove: [ ]

Mohammad Sepehrifar
Approve: [X] Disapprove: [ ]

Julie Shedd
Approve: [X] Disapprove: [ ]

Seungjae Shin Digitally signed by Seungjae Shin Date: 2025.02.27 11:23:34 -05'00'

Seungjae Shin
Approve: [X] Disapprove: [ ]

Carolina Siniscalchi
Approve: [X] Disapprove: [ ]

Jason Street
Approve: [X] Disapprove: [ ]

Ed Swan
Approve: [X] Disapprove: [ ]

Hasan Tekedar
Approve: [X] Disapprove: [ ]

Ryan Walker
Approve: [ ] Disapprove: [ ]

Guiming Wang
Approve: [X] Disapprove: [ ]

Merrill Warkentin
Approve: [X] Disapprove: [ ]

MISSISSIPPI STATE UNIVERSITY

College of Arts and Sciences
Department of Mathematics and Statistics
P.O. Box MA
Mississippi State, MS 39762
P. 662.325.3414
F. 662.325.0005
www.math.msstate.edu

To Whom it may concern,

The Department of Physics is modifying their concentration in Quantum Computing for their Bachelor of Science degree. This modification requires students to take MA 2743: Calculus IV and MA 3253: Differential Equations. The Department of Mathematics and Statistics supports the modification understanding that enrollments in those courses can and will increase. The Courses and Curriculum Committee at the department level, the entity writing this letter, is in full support of creation of these new programs. Please accept this letter of support.

Sincerely,

Dr. Matt McBride
Associate Professor and Undergraduate Coordinator
Department of Mathematics and Statistics
Mississippi State University

Dr. Mohammad Sepehrifar
Associate Professor
Department of Mathematics and Statistics
Mississippi State University

Mohsen Razzaghi

Digitally signed by Mohsen Razzaghi
DN: cn=Mohsen Razzaghi, o=Mississippi State University, ou=Mathematics and Statistics, email=razzaghi@math.msstate.edu, c=US
Date: 2025.04.08 08:05:50 -05'00'

Dr. Mohsen Razzaghi
Professor and Department Head
Department of Mathematics and Statistics
Mississippi State University

Chuanxi Qian

Dr. Chuanxi Qian
Professor
Department of Mathematics and Statistics
Mississippi State University

Jonathan Woody

Dr. Jon Woody
Associate Professor
Department of Mathematics and Statistics
Mississippi State University

Robert Banik

Mr. Robert Banik
Instructor and Undergraduate Advising Coordinator
Department of Mathematics and Statistics
Mississippi State University

MISSISSIPPI STATE UNIVERSITY

DATA SCIENCE ACADEMIC INSTITUTE
133 Etheredge Hall
Mississippi State, MS 39762
662.325.3168
datascience.msstate.edu

February 24, 2025

To: UCCC Committee Members

From: Mimmo Parisi
Executive Director
Data Science Academic Institute

The Data Science Academic Institute supports the inclusion of the following two courses within the curriculum for the proposed Bachelor of Science in Data Science, Quantum Computing concentration. This concentration will be hosted by the Department of Physics.

DSCI 4553 Data Science Senior Capstone I
DSCI 4663 Data Science Senior Capstone II

Sincerely,

Mimmo Parisi

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, 2024

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

The College of Arts & Sciences supports the addition of a Quantum Computing concentration to the Bachelor of Science in Data Science degree. This concentration offers students an opportunity to study an important emerging area of physics research, and we support the inclusion of our college's math and physics courses in the curriculum.

Sincerely,

Dr. Rick Travis,
Dean of the College of Arts & Sciences