MISSISSIPPI STATE UNIVERSITY™

UNIVERSITY COMMITTEE ON COURSES AND CURRICULA

A MEMORANDUM

DATE April 12, 2019

TO: UCCC Members

FROM: Dr. Dana Pomykal Franz, Chair

SUBJECT: April 25, 2019 Meeting

Enclosed are the minutes from the meeting on March 22, 2019 and the agenda and proposals for the meeting on **Thursday, April 25, 2019 beginning at 9:00 a.m.** The meeting will be held in the **Trotter Room (Room 2200) of the Center for Advanced Vehicular Systems in the Research Park**. Please contact the UCCC office if you are unable to attend.

Thank you.

Enclosures: March 22, 2019 Meeting Minutes
Course/Curriculum Proposals

Post Office Box 5268 • Starkville, MS 39762 • Office: (662) 325-9410 • Fax: (662) 325-1846

AGENDA
UNIVERSITY COMMITTEE ON COURSES AND CURRICULA
April 25, 2019

1. **Welcome**
2. **Approval of minutes**
3. **Course proposals by college/school:**

ACADEMIC AFFAIRS

Addition	CMB 8011	Graduate Seminar
Addition	CMB 8013	Applied Computational Biology
Modification +Online/Distance +Meridian	DSS 0113	Money Math: Practical Money Skills
Addition +Online/Distance +Meridian	DSS 0133	Money Math: Money Management
Addition +Online/Distance +Meridian	DSS 0153	Money Math: Financial Literacy
Modification +Online/Distance +Meridian	DSS 0713	Basic Employment: Career Exploration
Addition +Online/Distance +Meridian	DSS 0733	Basic Employment: Maintaining Employment

AGRICULTURE AND LIFE SCIENCES

Addition +Online /Distance	ADS 8133	Endocrine Secretions
Modification +Online/Distance	ADS 8423	Meat Science
Modification +Online/Distance	ADS 8463	Advanced Animal Nutrition
Addition	AELC 4723	Pedagogy of AgriScience Programs
Modification	FDM 2553	Introduction to Merchandising
Modification	FDM 3553	Merchandise Retail Pricing and Inventory Management
+Online/Distance	FDM 4513/6513	Fashion Consumer Behavior
Modification	FDM 4693/6693	Digital Merchandising
Addition	FDM 6683	Research and Application in Fashion Entrepreneurship
Addition	FDM 6793	Research and Application in Digital Fashion Retailing
Modification +Online/Distance	FNH 8423	Meat Science
Modification	GA 1111	Survey of Agriculture
+Online/Distance	HDFS 4843	Family Interaction
+Online/Distance	HDFS 4853/6853	The Family: A Human Ecological Perspective
Addition	PSS 4733/6733	Ag. Flight Technologies I
Addition	PSS 4743/6743	Ag. Flight Technologies II

ARCHITECTURE, ART AND DESIGN

+Online/Distance	ART 1013	Art History I
+Online/Distance	ART 1023	Art History II
+Online/Distance	ART 3633	History of Photography
Addition	ID 4683	Lessons from the Theatre: Architectural Lighting Design

ARTS AND SCIENCES

+Online/Distance	AN 1103	Introduction to Anthropology
Modification	AN 4313	Human Osteology
Modification	CRM 3033	Criminology Internship

BUSINESS

+Online/Distance	MKT 3323	International Logistics

EDUCATION

Modification	EPY 8214	Intermediate Educational and Psychological Statistics
Modification +Online/Distance	EPY 9213	Multivariate Analysis in Educational Research
Modification	INDT 1203	Industrial Drafting & Print Reading
Modification	INDT 1814	Basic Industrial Electricity and Electronics
Modification	INDT 2113	Introduction to PLC Programming
Modification	INDT 2123	Introduction to CNC Programming
Modification	INDT 2323	Welding Technology
Modification	INDT 2613	Industrial Fluid Power
Modification	INDT 3044	Industrial Safety
Modification	INDT 3063	Industrial Human Relations
Modification	INDT 3104	Advanced Industrial Electricity and Electronics
Modification	INDT 3223	Industrial Materials
Modification	INDT 3243	Industrial Metrology
Modification	INDT 3343	3D Modeling for Manufacture
Modification	INDT 3363	Motion and Time Study
Modification	INDT 3373	Forecasting and Cost Modeling
Modification	INDT 3683	CNC Machining Processes
Modification	INDT 3813	Writing for Industry
Modification	INDT 4103	Industrial Control Systems
Modification	INDT 4203/6203	Automated Systems
Modification	INDT 4213	Survey of Energy Sources and Power Technology
Modification	INDT 4224/6224	Quality Assurance
Modification	INDT 4233/6233	Maintenance Management
Modification	INDT 4263/6263	Manufacturing Technology and Processing
Modification	INDT 4303/6303	Industrial Robotics
Modification	INDT 4343	Computer Aided Drafting and Design
Modification	INDT 4373	Lean Six Sigma
Modification	INDT 4403	Automated Systems II
Modification	INDT 4463	Manufacturing Technology & Processes II
Modification	INDT 4801	Senior Seminar

ENGINEERING

Addition +Online/Distance +Gulf Coast	ASE 4353/6353	Combustion Theory and Modeling
+Online/Distance	ASE 6163 (split level with ASE 4163)	Introduction to Flight Test Engineering
Addition +Online/Distance	CE 4173/6173	Travel Behavior Modeling and Forecasting
+Online/Distance	EM 2413	Engineering Mechanics I
+Online/Distance	EM 2433	Engineering Mechanics II
+Online/Distance	EM 3213	Mechanics of Materials
+Online/Distance	EM 3313	Fluid Mechanics
Addition +Online/Distance + Gulf Coast	IE 1313	Lean Works Systems
Addition +Gulf Coast	IE 4914	Industrial Systems Design
Addition +Online/Distance +Gulf Coast	IE 4933/6933	Information System in Industrial Engineering
+Online/Distance	GE 6513	Engineering Writing and Presenting
Addition +Online/Distance	GE 8303	Introduction to Military Engineering

FOREST RESOURCES

Modification +Online/Distance	SBP 1103	Introduction to Sustainable Bioproducts
Modification	SBP 2123	Materials and Processing of Structural Bioproducts
Modification	SBP 4123/6123	Lumber Manufacturing
Modification +Online/Distance	SBP 6013 (split level with 4013)	Wood Anatomy
Modification	SBP 6263 (split level with 4263)	Furniture Design and Fabrication
+Online/Distance	SBP 6313 (split level with 4313)	Bioproducts and the Environment
Modification +Online/Distance	SBP 6353 (split level with 4353)	Forest Products Marketing
Modification	SBP 8111	Research Seminar I
Modification	SBP 8121	Research Seminar II
Modification	SBP 8123	Advanced Lignocellulosic Biomass Chemistry
Modification +Online/Distance	SBP 8133	Environmental Issues in Sustainable Bioproducts
Modification	SBP 8213	Advanced Wood Mechanics

4. Degree proposals by college/school

ACADEMIC AFFAIRS

Addition (Authorization to Plan & New Degree Proposal)	Ph.D.	Computational Biology
Addition (Authorization to Plan & New Degree Proposal)	MS	Computational Biology
Addition	Minor	Computational Biology

AGRICULTURE AND LIFE SCIENCES

Addition	Certificate (Undergraduate)	Retail

BUSINESS

Modification	BBA	Marketing

EDUCATION

Modification	BS	Industrial Technology (Campus 1)
Modification	BS	Industrial Technology (Campus 5)

ENGINEERING

Modification	Ph.D.	Engineering: Biological
Modification	BS	Industrial Engineering

University Committee on Courses and Curricula
Mississippi State University
March 22, 2019

Members Present:	Amy Adkerson, Tracey Baham, Randy Campbell, Russell Carr, Cody Coyne, Padmanava Dash, Dana Franz, Charles Freeman, Trey Howell, Kevin Hunt, Tori Marshall, Pat Matthes, Rob Moore, Emily Owen, Tommy Parker, Andy Perkins, Tommy Phillips, Matthew Priddy, Wendy Roussin, Kathy Sherman-Morris, Marian Swindell, Brad Trinkle, Jenny Turner, Erica Waldman, Jeff Winger, Chien Yu, Matthew Zimmerman
Excused:	Amy Crumpton, Caroline Kobia, Qingmin Meng, Robert Wolverton
Absent:	Arman Borazjani, Seamus Freyne, Joshua Hartley, Darrell Sparks
Guests:	Richard Damms, Kylie Forsythe, Angel Fason, Kasia Gallo, Donna Gordon, Alisha Hardman, Aaron McElfish, Lynda Moore, Robert Otondo, Ginger Pizer, Phillip Poe, Peter Ryan, Dennis Truax, Molly Zuckerman

Franz called the meeting to order at 1:30 p.m. on Friday, March 22, 2019 in Room 324 of the Student Union. Franz thanked Perkins for chairing the February UCCC meeting. Franz announced she met with Dr. Peter Ryan, Associate Provost for Academic Affairs, recently, and Dr. Ryan is very pleased with the thoroughness of the UCCC reviews of course and program proposals.

Carr moved to approve the minutes from the February 15, 2019 UCCC meeting. Hunt seconded the motion. The motion to approve the February 15, 2019 minutes was approved unanimously.

Howell moved to approve the addition of LIB 9010 Electronic Thesis/Dissertation Format and Submission. Roussin seconded the motion. Committee members discussed how the course will be implemented for graduate students. The motion to approve was approved unanimously.

Freeman moved to approve the addition of ART 4773/6773 Digital Drawing. Yu seconded the motion. The subcommittee that reviewed the proposal noted in the class participation portion of the syllabus failure to participate in classroom discussions and critiques may lead to a failing grade but participation is not included in the project breakdown assessment. This provision needs revision or clarification. Hunt moved to pass the addition of ART 4773/6773 contingent upon the above concern being addressed. Roussin seconded the motion. The motion to pass contingent was approved unanimously.

Howell moved to approve the addition of online/distance education to CE 4703/6703 Construction Engineering and Management. Carr seconded the motion. The subcommittee that reviewed the proposal recommended approval and cited the proposal as a good example for other initiators adding

distance education. The motion to approve the addition of distance education to CE 4703/6703 was approved unanimously.

Howell moved to approve the addition of online/distance education to CSE 1233 Computer Programming with C and CSE 2813 Discrete Structures. Freeman seconded the motion. The motion to approve the addition of online/distance education to CSE 1233 and CSE 2813 was approved unanimously.

Freeman moved to approve the modification of the BAT in Healthcare Services, and Event and Hospitality Services. Priddy seconded the motion. Dr. Richard Damms and Dr. Peter Ryan appeared in support of the proposal. The committee members were concerned that the statement on the cover sheet that MGT 3114 had been deleted was misleading and suggested the language be edited to reflect that MGT 3114 has been revised to MGT 3113. Carr moved to pass the modification of the BAT contingent upon the above concern being addressed. Howell seconded the motion. The motion to pass the modification of the BAT contingent was approved unanimously.

Carr moved to approve the addition of distance education to ADS 8243 Advanced Physiology of Reproduction. Trinkle seconded the motion. The subcommittee that reviewed the proposal was concerned there was not sufficient information in the syllabus for Campus 5 students. Specifically, the subcommittee was concerned the syllabus did not outline how distance students would participate in the journal club, how the distance students would lead discussions, when the distance students can watch videos of the lectures, and how students comment/provide feedback on the video presentations of other students. The subcommittee pointed out that some of this information is contained in the proposal but is not in the student syllabus. The subcommittee also pointed out that the syllabus indicates that missed exams are only made up for emergency situations, and this policy may not be in compliance with AOP 12.09. Hunt moved to pass the addition of distance education to ADS 8243 contingent upon the above concerns being addressed. Coyne seconded the motion. The motion to pass the addition of distance education to ADS 8243 contingent was approved unanimously.

Carr moved to approve the addition of FNH 4793/6793 Health Promotion in the Workplace and the addition of online/distance education to FNH 4793/6793. The subcommittee that reviewed the proposal was concerned there was not sufficient information in the syllabus for distance students; the make-up policy mentions “valid evidence” for allowing late accommodations instead of excused absences as outlined in AOP 12.09; Canvas should be referenced instead of MyCourses; and on the grading scales, the percentages listed do not match the points indicated. Freeman moved to pass the addition of FNH 4793/6793 and the addition of online/distance education to FNH 4793/6793 contingent upon the above concerns being addressed. Roussin seconded the motion. The motion to pass contingent was approved unanimously.

Carr moved to approve the addition of HDFS 2023 Trauma Informed Practice and the addition of online/distance education to HDFS 2023. Moore seconded the motion. The subcommittee that reviewed the proposal was concerned there was not sufficient information in the syllabus for distance students. Priddy moved to pass the addition of HDFS 2023 and the addition of distance education to HDFS 2023 contingent upon the above concern being addressed. The motion to pass contingent was approved unanimously.

Carr moved to approve the modification of PHY 8133 Endocrine Secretions and the addition of online/distance education to PHY 8133. The subcommittee that reviewed the proposal recommended

approval. The motion to approve the modification of PHY 8133 and the addition of online/distance education to PHY 8133 was approved unanimously.

Carr moved to approve the addition of PSS 8012 Thesis Proposal Writing. Freeman seconded the motion. Dr. Amelia Fox appeared in support. The subcommittee that reviewed the proposal was concerned that the syllabus states no late assignments will be allowed which is not in compliance with AOP 12.09; the computer requirement statement needs to specify how students will be accommodated if they do not have the computers recommended; and the assessment method does not explain the difference between Unit Points and Points (for example, poster assignment is worth 100 Unit Points but then worth 150 Points). Hunt moved to approve the addition of PSS 8012 contingent upon the above concerns being addressed. Coyne seconded the motion. The motion to pass PSS 812 contingent was approved unanimously.

Carr moved to approve the addition of the Undergraduate Certificate in Trauma-Informed Child Advocacy. Priddy seconded the motion. Dr. Alisha Hardman appeared in support of the proposal. Dr. Hardman explained how the elective courses would be approved by departmental faculty. The Undergraduate Certificate in Trauma-Informed Child Advocacy may be listed as approved when the contingency for HDFS 2023 has been cleared since HDFS 2023 is a required course for the certificate. Hunt moved to pass the addition of the Undergraduate Certificate in Trauma-Informed Child Advocacy contingent upon the approval of HDFS 2023. Trinkle seconded the motion. The motion to pass contingent was approved unanimously.

Campbell moved to approve the additions of FDM 6443 Advanced Patternmaking and Design, FDM 6463 Advanced Draping, FDM 6613 Research in Fashion Consumer Behavior, FDM 6683 Research and Application in Fashion Entrepreneurship, FDM 6783 Experimental Fashion Design, FDM 6793 Research and Application in Digital Fashion Retailing; FDM 6873 Advanced Computer-Aided Design for Fashion; and the modification of the MS in Fashion Design & Merchandising. Trinkle seconded the motion. The subcommittee that reviewed the proposals made the following observations about the proposals: for FDM 6443, the lecture to undergraduate students is listed as 100 points, but there is no other mention of this assignment or how it is evaluated in the syllabus, and professionalism is listed for 100 points, but the only mention of how professionalism is graded is that 5 points are deducted beyond 2 unexcused absences; for FDM 6463, the course proposal is for FDM 6463, but the syllabus and the degree modification both list the course as FDM 6563, and there is little information about the lecture to undergraduate students and how the professionalism points are earned; for FDM 6613, there needs to be more information about the attendance policy with a reference to AOP 21.09; for FDM 6683, there were no concerns; for FDM 6783, there is no attendance policy, and while “paperwork for one juried competition” and “professionalism” are both listed as 100 points (or 10%) of the grade, but little to no information about these assignments or how the grading is given; for FDM 6793, there were no concerns; for FDM 6873, the course proposal lists the course as an one hour lecture and four hours lab while the syllabus indicates it is a two hours lecture and two hours lab, so this conflict needs to be resolved. For the program modification, the subcommittee felt the justification should be strengthened, it needs to be determined whether FDM 6563 should be FDM 6563 or FDM 6463, and the credit hours for FDM 6123 and FDM 6573 should be listed. Roussin moved to pass the course proposals for FDM 6443, FDM 6463, FDM 6613, FDM 6683, FDM 6783, FDM 6793, FDM 6873 and the modification of the MS in Fashion Design & Merchandising contingent upon the above concerns being addressed. Hunt seconded the motion. The motion to pass contingent was approved unanimously.

Hunt moved to approve the addition of online/distance education to AN 1103 Introduction to Anthropology. Trinkle seconded the motion. Dr. Molly Zuckerman appeared in support. The subcommittee that reviewed the proposal was concerned that the requirements for the online/distance course are significantly more demanding than the requirements for the face to face course, and therefore there is an equivalency issue. Carr moved to table the addition of online/distance education to AN 1103 based upon the above concerns. Freeman seconded the motion. The motion to table the proposal to add online/distance education to AN 1103 was approved unanimously.

Hunt moved to approve the addition of CO 4343 Backpack Video Journalism, the addition of CO 4394 Broadcast Capstone, and the modification of the BA in Communication. Roussin seconded the motion. The subcommittee that reviewed the proposals made the following observations: for CO 4343, in the course syllabus a grading scale needs to be added, MyCourses references should be revised to Canvas, a typographical error in the first sentence about Learning Objectives needs to be revised, AOP 12.09 is mentioned in the Deadlines section but also needs to be included in Attendance section, and a clarification needs to be made about allowing make up work for excused absences; for CO 4394, the attendance policy needs to be clarified especially with regard to losing all attendance points, and AOP 12.09 needs to referenced. The subcommittee that reviewed the program proposal recommended approval of the program proposal after the CO 4343 and CO 4394 course proposals are cleared of the contingencies. Perkins moved to approve the addition of CO 4343, the addition of CO 4394, and the modification of the BA in Communication contingent upon the above concerns being addressed. Freeman seconded the motion. The motion to pass contingent was approved unanimously.

Hunt moved to approve the addition of FLC 3153 Chinese V and FLC 3163 Chinese VI. Trinkle seconded the motion. The subcommittee that reviewed the proposals recommended approval. The motion to approve the addition of FLC 3153 and FLC 3163 was approved unanimously.

Hunt moved to approve the modification of GR 4443/6443 Weather Predication I. Priddy seconded the motion. The subcommittee that reviewed the proposal recommended approval. The motion to approve the modification of GR 4443/6443 was approved unanimously.

Hunt moved to approve the modification of the minor in English. Priddy seconded the motion. The subcommittee that reviewed the proposal recommended approval. The motion to approve the modification of the minor in English was approved unanimously.

Priddy moved to approve the addition of a Graduate Certificate in General Biology. Hunt seconded the motion. Dr. Donna Gordon appeared in support. UCCC members discussed who this certificate is designed for and what prerequisites would be needed. The motion to approve the addition of a Graduate Certificate in General Biology was approved unanimously.

Carr moved to approve the modification of BIS 8213 Secure Systems Analysis and Design. Hunt seconded the motion. The subcommittee that reviewed the proposal observed that the contact hours information is not on the revised syllabus with increments no larger than three (3) contact hours; a grading scale is not outlined in the syllabus; Team Project Guidelines are included in the current syllabus but not in the revised syllabus; the no make-up exam policy does not seem to be in compliance with AOP 12.09; there is no attendance policy in the syllabus; and it would be helpful if the syllabus was outlined similar to the syllabus template on the MSU Teaching and Learning Center website. Moore moved to approve the modification of BIS 8213 contingent upon the above concerns being addressed. Coyne seconded the motion. The motion to pass contingent was approved unanimously.

Roussin moved to approve the modification of FIN 4243 Senior Seminar in Financial Management and FIN 4433 Senior Seminar in Portfolio Management. Coyne seconded the motion. The subcommittee that reviewed the proposals recommended approval. The motion to approve the modification of FIN 4243 and FIN 4433 was approved unanimously.

Roussin moved to approve the addition of MKT 4223 Social Media Marketing and the addition of online/distance education to MKT 4223. Coyne seconded the motion. The subcommittee that reviewed the proposal noted that the syllabi need to include the Honor Code statement and the Honor Code link, the catalog description on the proposal and the syllabus does not match, the requirements for Hootsuite Certification are different for face to face and online, and the Office Hours and Contacting Me section on the online syllabus need updating to better reflect that platform. Moore moved to pass the addition of MKT 4223 and the addition of distance education to MKT 4223 contingent upon the above concerns being addressed. Perkins seconded the motion. The motion to pass content was approved unanimously.

Coyne moved to approve the modification of the BBA in Finance. Roussin seconded the motion. The subcommittee that reviewed the proposal noted that some of the credit hours in the columns are not correctly aligned with the courses. The subcommittee recommended a revised copy be submitted to the UCCC Office. The motion to approve the modification of the BBA in Finance was approved unanimously.

Roussin moved to approve the modification of the MSIS in Information Systems (Campus 1 and Campus 5). Swindell seconded the motion. The subcommittee that reviewed the proposal recommended approval. The motion to approve the modification of the MSIS in Information Systems (Campus 1 and Campus 5) was approved unanimously.

Moore moved to approve the addition of online/distance education to EPY 3063 Psychology of Individual Differences and Exceptional Ability, the modification and addition of online/distance education to EPY 3503 Principles of Educational Psychology, the addition of online/distance education to EPY 3513 Writing in the Behavioral Sciences, the modification and addition of online/distance education to EPY 4033/6033 Application of Learning Theories, the addition of online/distance education and the Meridian designation for EPY 4113/6113 Principles of Behavior Analysis, the addition of online/distance education to EPY 4214/6214 Educational and Psychological Statistics, and the modification and addition of online/distance education to EPY 4313 Measurement and Evaluation. Freeman seconded the motion. The subcommittee that reviewed the proposals recommended adding percentages to the grading scales on the syllabi but did not see any other issues with the proposals. The motion to approve was approved unanimously.

Hunt moved to adjourn. Freeman seconded the motion. The motion to adjourn was approved unanimously. The meeting was adjourned at 4:20 p.m.

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: Office of Academic Affairs **Department:**

Contact Person: Peter Ryan **Mail Stop: 9723** **E-mail: ryan@provost.msstate.edu**
Nature of Change: Degree addition **Date Initiated: 3/5/19** **Effective Date: Spring 2020**
Current Degree Program Name:

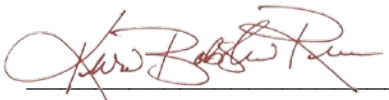
Major: **Concentration:**

New Degree Program Name: Doctor of Philosophy

Major: Computational Biology **Concentration:**

Summary of Proposed Changes:
The Office of Academic Affairs, in collaboration with the College of Arts & Sciences, Bagley College of Engineering, College of Agriculture and Life Sciences, and College of Veterinary Medicine proposes a new interdisciplinary graduate program in computational biology. Students will be prepared to pursue research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

Approved: **Date:**



_____ _____4/9/2019_____

Department Head

_____ _____

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

NEW GRADUATE DEGREE OUTLINE FORM

Use the chart below to indicate your new degree outline. Please list required College and Major Required Courses and if appropriate Concentration Courses. Graduate programs that wish to specialize beyond the Major must have at least two concentrations. Add additional rows as needed for programs with more than two concentrations. Expand rows as needed

PROPOSED New Degree	
Degree: PhD Major: Computational Biology	
Graduate study leading to the Master of Science and Doctor of Philosophy degrees is offered in the area of computational biology. This interdisciplinary graduate program provides a firm foundation in computational methods and biological knowledge, and draws courses from various colleges to provide a flexible program of study.	
Proposed Curriculum Outline	Required Hours
Major Required Courses: CMB 8013 Applied Computational Biology Seminar: CMB 8011 Graduate Seminar Computing: CSE 6623 Computational Biology CSE 6833 Algorithms Select one from below: CSE 8673 Machine Learning CSE 8833 Algorithms CSE 8163 Parallel and Distributed Scientific Computing Statistics: ST 8114 Statistical Methods Life Sciences (select two from below): BCH 6713 Molecular Biology BCH 8653 Genomes and Genomics BIO 6113 Evolution BIO 6143 Population Genetics Additional approved electives Dissertation: CMB 9000 Dissertation Research	 3 1 3 3 3 4 6 12 20
Total Hours	55

- At least 18 credit hours of GPA-graded coursework must be taken at the 8000-level or higher.
- Graduate courses completed as part of a master's degree or graduate courses completed prior to entry into the PhD program may, when approved by the student's graduate committee, be applied to the PhD degree requirements. The committee's decision will be documented by an "Attachment Sheet for Program of Study" form. The program of study will cover remaining coursework requirements. At least one course at the full graduate level in computer science and at least one course at the full graduate level in the life

sciences must be completed at MSU.

- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee.

Prerequisites

CSE 2813 Discrete Structures	3
CSE 2383 Data Structures*	3

*This requirement can be satisfied by completing CSE 6753 Fundamentals of Computing with a grade of B or higher.

All undergraduate prerequisite courses listed must be satisfied. A PhD student's program of study may include 6000-level prerequisite courses.

1. Curriculum Outline

   Three new courses will be necessary and proposals have been submitted in CIM.

   CMB 8011 Graduate Seminar
   CMB 8013 Applied Computational Biology
   CMB 9000 Dissertation Research

2. Student learning outcomes and assessment

   Learning outcomes:
   1. Graduates will be prepared to serve in computational biology research positions in academia, industry, and government.
   2. Graduates will be able to communicate effectively through scientific presentations and papers with a diverse audience of their peers in biology, molecular biology, computer science, and other areas of the computational and life sciences.
   3. Graduates will be able to postulate well-reasoned hypotheses and apply sound scientific principles, knowledge, and methods to collect and analyze data to test these hypotheses.

   Assessment methods:
   Students will be expected to conduct research and present findings throughout their work in the graduate program. Students will also identify a dissertation topic and carry out the research related to that topic. This work will be described in their dissertation and presented at their dissertation defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology.

3. Support

   A letter of support from the associate deans of colleges involved in the degree program is attached.

4. Proposed 4-letter abbreviation

   COMB

5. Effective date:

   Spring 2020

6. CIP Code:

   26.1104

Appendix 7: Authorization to Plan a New Degree Program
(Submit Appendix 7 in both PDF and Word Document Formats)

Institution: Mississippi State University

Date of Implementation:	Incremental, Six Year Cost of Implementation:	Incremental, Six-Year Per Student Cost of Implementation:
May 16, 2019	$791,277	$15,826

Will it attract new students to the university?	Potential Six-Year, New Revenue:	Potential New, Six-Year Revenue Per Student:
☒ Yes ☐ No	$1,701,799	$34,036

Program Title as will Appear on Academic Program Inventory, Diploma, and Transcript:	Six-Digit CIP Code:
Computational Biology	26.1104

Name of Degree(s) to be Awarded:	Total Credit Hour Requirements to Earn the Degree:
Doctor of Philosophy	55

List any institutions within the state offering similar programs:

None

Responsible Academic Unit(s):

Office of Academic Affairs

Institutional Contact: Dr. Peter Ryan
Phone: 662-325-0730
Email: ryan@provost.msstate.edu

Number of Students Expected to Enroll in First Six Years:		Number of Graduates Expected in First Six Years:	
Year One	5	Year One	1
Year Two	5	Year Two	3
Year Three	10	Year Three	3
Year Four	10	Year Four	3
Year Five	10	Year Five	5
Year Six	10	Year Six	5
Total	50	Total	20

Program Summary:

The interdisciplinary computational biology PhD degree program will prepare students for research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

Chief Academic Officer Signature **Date**

Institutional Executive Officer Signature **Date**

Institution:

1. Describe the proposed program and explain how it fits within the mission of the institution.

The proposed program will train students to become independent researchers in the highly interdisciplinary area of computational biology, which encompasses diverse specializations and involves faculty in almost every college in the university. This program will build upon the University's strength in the areas of genomics, evolutionary genetics, statistics, big data, machine learning, and others to offer rigorous preparation and opportunities for high-impact research. This program helps Mississippi State University fulfill its mission to enhance its strength in agriculture, engineering, and natural sciences. It also has the potential to help Mississippi State contribute to the economic development of the state by producing a workforce with the skills needed for modern biological research.

2. Provide the information used to determine Mississippi's need for this program. Be specific and provide supporting data.

While computational biology is a well-established research area, it is an emerging discipline for formal education and training in academia. Universities across the country are beginning to offer graduate and undergraduate programs in computational biology to train the next generation of scientists who will be using computational methods and big data to answer important questions in the life sciences. In the SEC, the University of Georgia offers a graduate program in Integrated Life Sciences and Vanderbilt University offers a graduate degree in Biomedical Informatics. These are degrees that offer training comparable to a computational biology program. Establishing this program at Mississippi State University will ensure that Mississippi is a leader in the South in producing computational biologists.

The primary need for this program is indicated by the research interests of faculty at Mississippi State University. Researchers have found that answering key questions about life often requires the use of new technologies and the collection of massive amounts of data. These new technologies have driven what has been termed the "big data revolution" in science, which has necessitated computational approaches in almost all areas of the life sciences. Those on the forefront are already using the educational infrastructure and skills of the faculty at Mississippi State to produce graduates that are well-prepared in these areas. The proposed degree program will allow students to earn the credential (PhD in Computational Biology) that is most closely aligned with their expertise and interests. This degree will often allow graduates to pursue positions that might not have been available with a degree in the life sciences, or positions that will have a significantly higher pay rate.

There is a need for computational biology researchers within Mississippi. Several research labs and institutes across the state conduct research in computational biology, including the University of Mississippi Medical Center, USDA-Agricultural Research Service (ARS), US Forest Products Lab, and the US Army Corps of Engineers Engineer Research and Development Center (ERDC). Many Mississippi State University graduate students and PhD graduates have gone on to research scientist positions with these organizations.

As we continue to produce highly-skilled graduates in computational biology, Mississippi will become more

attractive to genomics, biotechnology, and pharmaceutical industries. Surrounding states such as Alabama and Tennessee have recently been able to attract such industries.

3. Provide information on employment (supporting data must include state and national employment statistics or career opportunities (include potential earnings range).

Graduates of this program will go on to research positions in academia, industry, and government. In addition to faculty positions in academia, prior Mississippi State University PhD graduates that would have been potential candidates for this degree program have pursued positions such as bioinformatician at a medical school, computational scientist at a research university, senior researcher at an international industry research lab, research scientist for a consumer products corporation, and manager of information technology research cyberinfrastructure for a major research institute.

As of May 14, 2018 over 100 jobs in the area of computational biology had been posted at the International Society for Computational Biology (ISCB) web site within the past three months, the premier international professional organization for computational biologists. Many more jobs requiring the skills of computational biologists are regularly posted to the Association for Computing Machinery, Computing Research Association, Academic Keys, and other employment sites.

According to the Mississippi Department of Employment Security occupational projections, the need for postsecondary teachers in the biological sciences is expected to grow by over 17% by 2024, and computer science postsecondary teachers by over 11%. These jobs pay on average $72,000-$79,000. However, employment in biological sciences positions (paying on average approximately $77,000) is expected to primarily remain steady or even drop slightly over this period. The proposed program has the potential to provide trained scientists to fill positions in Mississippi and possibly attract additional industry to the state, alleviating this concern.

4. Describe any other benefits to the institution, state, region, or nation including research, service, and teaching efforts that might result from offering this program.

Many faculty members likely to be involved in this program have a record of outreach to K-12 students and teachers. For example, Dr. Nanduri (Basic Sciences, College of Veterinary Medicine) and Dr. Perkins (Computer Science, Bagley College of Engineering) have helped to instruct workshops of Mississippi teachers in the area of computational biology. Dr. Hoffmann (Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture and Life Sciences) and Dr. Perkins have received funding from Mississippi State University to instruct undergraduate and high school students in construction, administration, and use of clusters of miniature portable computers for genomics research.

Drs. King (Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture and Life Sciences), Nanduri, and Perkins have each pursued federal grants for training graduate students in this area. The establishment of this degree program will make Mississippi more competitive for these grant funds, which would attract students from around the region and the country to graduate studies in Mississippi.

5. Using expected enrollment, provide the total anticipated budget for the program including implementation and 5 subsequent years (total of 6 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
2019-2020	5	5	$104,736	$31,251	$48,600	$104,736	$(122,085)
2020-2021	5	9	$109,980	$32,814	$86,076	$109,980	$(163,242)
2021-2022	10	16	$115,461	$34,455	$149,904	$115,461	$(230,910)
2022-2023	10	23	$121,234	$36,177	$220,752	$121,234	$(305,809)
2023-2024	10	30	$127,296	$37,986	$284,580	$127,296	$(373,890)
2024-2025	10	35	$0	$39,886	$333,180	$0	$(293,294)
TOTAL		118	$578,707	$212,570	$1,123,092	$578,707	$(1,489,230)

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

Start-Up Costs: one-time costs associated with offering this program

Direct, Incremental Costs: additional annual costs to the university as a result of offering this program

Incremental Revenue: additional annual revenue assuming that this program will bring in new students paying full tuition

Non-Tuition Revenue: external funds, grants, contracts or other revenues attributable to the addition of this program

Differential: all revenues minus all costs

Enrollment estimates assume 1 student graduates after the first year of the program, increasing to 3 during years 2-4, and up to 5 during year 5. Start-Up costs include the cost of 3 graduate assistantship positions to attract students to the program during the first 5 years, at $22,000 annually, plus tuition and fees. Additional annual costs include 12.5% salary release for a graduate coordinator annually, and half the cost of offering an additional section of CSE 6833 Introduction to Algorithms (shared with the MS program) including fringes, assuming 9-month salary of $100,000. Additional annual revenue includes tuition from enrolled students (75% out of state). Non-tuition revenue reflects expected support for 3 graduate assistantship positions available through new grants or contracts.

6. Indicate where the proposed program is offered within the state and explain anticipated consequences on enrollment in other institutions offering the program, including any ramifications on the Ayers settlement.

There are no institutions in Mississippi offering the proposed program.

7. What is the specific basis for determining the number of graduates expected in the first six years?

It is estimated that approximately 25 faculty at Mississippi State University will participate in the program by serving as major professor for PhD students. It is also expected that each faculty member will have approximately 1-2 students that will pursue this computational biology degree, while they also direct students in other programs. This gives 25-50 students enrolled in the program at any time. A number of other students are likely to begin the degree before having selected a major professor. It will take approximately 3-5 years to for a student to finish the program if entering immediately after completing the baccalaureate. Upon instituting the program, some students will immediately transfer from programs such as biological sciences, molecular biology, and computer science, leading to a number of graduates during the first 1-3 years of the program.

Almost all of the resources needed to offer this program already exist at MSU. MSU faculty are active in computational biology research and offer a more-than-adequate number of related courses to be used as program electives. A graduate studies committee consisting of one member from each involved College at MSU will make programmatic decisions. The only resource that will need to be added is salary for a graduate coordinator (a member of this committee, to be rotated every three years) to handle administrative tasks.

Five graduate teaching assistantship (GTA) positions are budgeted as startup costs during the first five years. These positions will be funded by non-tuition revenue.

Appendix 8: New Degree Program Proposal
(Submit Appendix 8 in both PDF and Word Document Formats)

Institution:

Date of Implementation:	**Incremental, Six-Year Cost of Implementation:**	**Incremental, Six-Year Per Student Cost of Implementation:**
Spring 2020	$791,277	$15,826

Will it attract new students to the university?	**Potential Six-Year, New Revenue:**	**Potential New, Six-Year Revenue Per Student:**
☒ **Yes** ☐ **No**	**$1,701,799**	**$34,036**

Program Title as will Appear on Academic Program Inventory, Diploma, and Transcript:	**Six-Digit CIP Code:**
Computational Biology	26.1104

Name of Degree(s) to be Awarded:	**Total Credit Hour Requirements to earn the degree:**
Doctor of Philosophy	55

List any institutions within the state offering similar programs:

None

Responsible Academic Unit(s):	**Institutional Contact: Dr. Peter Ryan**
	Phone: 662-325-0730
Office of Academic Affairs	**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 Six Years:		**Number of Graduates Expected in First Six Years:**	
Year One	5	**Year One**	1
Year Two	5	**Year Two**	3
Year Three	10	**Year Three**	3
Year Four	10	**Year Four**	3
Year Five	10	**Year Five**	5
Year Six	10	**Year Six**	5
Total	50	**Total**	20

Program Summary:

The interdisciplinary computational biology PhD degree program will prepare students for research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

_____ _____

Chief Academic Officer Signature **Date**

Institutional Executive Officer Signature **Date**

Institution:

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.

A graduate studies committee will be formed consisting of one full-time tenured or tenue-track faculty from each college participating in the program. A college will be determined to be participating in the program if one of its faculty members is serving as major professor for a student in the program, or if one of its faculty members teaches a course that is required for the degree. Initially, committee membership will consist of:

Dr. Brian Counterman, Associate Professor, Department of Biological Sciences, College of Arts and Sciences

Dr. Federico Hoffmann, Associate Professor, Department of Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture and Life Sciences

Dr. Bindu Nanduri, Associate Professor, Department of Basic Sciences, College of Veterinary Medicine

Dr. Andy Perkins, Associate Professor, Department of Computer Science and Engineering, Bagley College of Engineering

This committee will be responsible for making admissions decisions, as well as programmatic decisions. The committee will also hear student petitions, approve or disapprove requirements completed at other institutions, and decide on other matters on a case-by-case basis. The committee will also be responsible for maintaining the curriculum and keeping it current.

The committee will select one of its members to serve as graduate coordinator. Initially graduate coordinator duties will be fulfilled by both Drs. Counterman and Perkins. The graduate coordinator will serve a three-year term after which a different committee member will serve as graduate coordinator. The graduate coordinator will be responsible for the logistics of handling applications for admission, admitting students, communicating and soliciting decisions from the committee, meeting with prospective and current students, and advising any students that have not yet selected a major professor.

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

Learning outcomes:

1. Graduates will be prepared to serve in computational biology research positions in academia, industry, and government.
2. Graduates will be able to communicate effectively through scientific presentations and papers with a diverse audience of their peers in biology, molecular biology, computer science, and other areas of the computational and life sciences.
3. Graduates will be able to postulate well-reasoned hypotheses and apply sound scientific principles, knowledge, and methods to collect and analyze data to test these hypotheses.

Assessment methods:

Students will be expected to conduct research and present findings throughout their work in the graduate program. Students will also identify a dissertation topic and carry out the research related to that topic. This work will be described in their dissertation and presented at their dissertation defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology.

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

There are no special admission requirements for the degree program. The program has two prerequisite courses (CSE 2383 Data Structures and CSE 2813 Discrete Structures), but these prerequisite courses may be taken simultaneously with graduate-level coursework after admission into the program. Admission into the program will be determined by a vote of the Graduate Studies Committee.

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.

No professional accreditation is currently available or will be sought for this program.

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.

a. Coursework

Students will complete a minimum of 35 hours of coursework and 20 hours of dissertation research.

Major Required Courses:

CMB 8011 Graduate Seminar	1
CMB 8013 Advanced Computational Biology	3
CSE 6623 Computational Biology	3
CSE 6833 Algorithms	3
Computing (Select one):	3
CSE 8673 Machine Learning	
CSE 8833 Algorithms	
CSE 8163 Parallel and Distributed Scientific Computing	
Statistics:	
ST 8114 Statistical Methods	4
Life Sciences (Select two):	6
BCH 6713 Molecular Biology	
BCH 8653 Genomes and Genomics	
BIO 6113 Evolution	
BIO 6143 Population Genetics	
Additional Approved Electives	12
Dissertation:	
CMB 9000	20

Total	55

- At least 18 credit hours of GPA-graded coursework must be taken at the 8000-level or higher.
- Graduate courses completed as part of a master's degree or graduate courses completed prior to entry into the PhD program may, when approved by the student's graduate committee, be applied to the PhD degree requirements. The committee's decision will be documented by an "Attachment Sheet for Program of Study" form. The program of study will cover remaining coursework requirements.
- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee. At least one course at the full graduate level must be taken in computer science and at least one course at the full graduate level in the life sciences must be taken at MSU.
- All undergraduate prerequisite courses must be satisfied. A PhD student's program of study may include 6000-level prerequisite courses.

b. Preliminary Examination

A preliminary examination will be scheduled after the student has completed, or is within 6 hours of completing, all course work and has had a dissertation topic approved by members of his/her committee. The examination will consist of a written examination and an oral examination administered by the student's graduate committee.

The major professor will collect the questions into a single examination that will be given to the student and Committee members. The time allotted for preparing written answers will be approximately 7 days. Written answers to the examination will be returned to the major professor who will distribute copies of all of the student's written answers to all of the Committee members.

The oral examination for the major exam will be scheduled approximately one week after the written answers have been completed by the student. During the oral portion of the major exam the student will give a short presentation to introduce his/her research topic and address any issues related to the examination that were raised by a committee member or that the student has determined need clarification. Further questioning related to the written examination by the committee is expected during the oral examination.

The grade received on the major exam will be determined by the examining committee. The student will be permitted one retry for each examination. A second attempt to pass the examination must be accomplished within four to six months of failure. A second failure results in dismissal from the program.

c. Dissertation Proposal

The dissertation proposal provides the student with the opportunity to formally present his/her dissertation proposal to the Graduate Committee. The proposal also allows for questioning by the Committee to clarify the objectives of the proposal, and allows for adjustment of objectives until agreement is reached between the student and the Graduate Committee.

The student will submit a written proposal to the graduate committee at least one week prior to the oral presentation. The format of the proposal shall conform to the University's Standard for Preparing Theses and Dissertations

The presentation shall consist of an oral presentation of the dissertation proposal that is open to the student's graduate committee only. At this time, the student and his/her Committee may negotiate specific changes in the proposed work.

The written proposal should contain a literature review in the proposed research area, a clear thesis statement, a description of the significance of the proposed area to the field, a proposed procedure for the conduct of the research and publication plan. The acceptability of the proposal will be determined by the Committee.

d. Dissertation

As required by the Graduate School, all candidates for the PhD degree in Computational Biology must submit a dissertation that exhibits mastery of the techniques of research and a distinct contribution to the field under investigation and study. The student's graduate committee must approve the dissertation topic, the outline, and both the initial and final submissions to the Library.

e. Dissertation Defense/Final Examination

The final examination is an oral defense of the dissertation that is open to the public. There is an open question period that is open to the public, and a closed question period open only to the candidate and the graduate committee. The examination will cover the research related to the dissertation.

The acceptability of the dissertation will be determined by the graduate committee.

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 in order to begin the program, give the desired qualifications of the persons to be added.

All of the faculty necessary to teach program courses, mentor students, and direct research are already present at MSU. The faculty below are expected to be available to advise students. All of these faculty are full-time instructional or research faculty at MSU. Some of the faculty will teach courses that are either required for or will be accepted as electives for the degree. In those cases, the relevant courses are listed.

Name	**Rank**	**Courses taught**
Biological Sciences		
Matthew Brown	Assistant Professor	
Matthew Ballinger	Assistant Professor	BIO 6990 Evolution of Infectious Diseases
Brian Counterman	Associate Professor	GRD 8013 Applied Computational Biology
Amy Dapper	Assistant Professor	BIO 6113 Evolution
Angus Dawe	Professor and Head	
Jean-Francois Gout	Assistant Professor	BIO 6143 Population Genetics

Heather Jordan	Assistant Professor	BIO 6990 Microbial Ecology
Ling Li	Assistant Professor	BIO 6990 Plant Data Resources
Mark Welch	Associate Professor	BIO 6113 Evolution
Chemistry		
Nick Fitzkee	Associate Professor	
Steven Gwaltney	Professor	
Charles Webster	Professor	
Computer Science and Engineering		
Andy Perkins	Associate Professor	CSE 6623 Computational Biology
John Swan	Professor	CSE 8990 Visualization with R
TJ Jankun-Kelly	Associate Professor	CSE 8413 Visualization
Mahalingam Ramkumar	Associate Professor	
Agricultural and Biological Engineering		
Lauren Priddy	Assistant Professor	
Raj Prabhu	Assistant Professor	
Electrical and Computer Engineering		
Bo Tang	Assistant Professor	
John Ball	Assistant Professor	
Basic Sciences, College of Veterinary Medicine		
Russell Carr	Associate Professor	
Larry Hanson	Professor	
Attila Karsi	Associate Professor	
Mark Lawrence	Professor	
Bindu Nanduri	Associate Professor	CVM 8993 Functional Genomics
Clinical Sciences, College of Veterinary Medicine		
Cyprianna Swiderski	Associate Professor	
Pathobiology and Population Medicine, College of Veterinary Medicine		
Amelia Woolums	Professor	
Institute for Genomics, Biocomputing and Biotechnology		
Daniel Peterson	Professor and Director	BCH 8653 Genomes and Genomics
George Popescu	Assistant Research Professor	BCH 8990 Systems Biology
Biochemistry, Molecular Biology, Entomology and Plant Pathology		
Federico Hoffmann	Associate Professor	GRD 8011 Seminar
Jonas King	Assistant Professor	BCH 6990 Introduction to Public Health
Jeffrey Dean	Professor and Head	
Shien Lu	Professor	

Zhaohua Peng	Professor	BCH 6713 Molecular Biology
Xueyan Shan	Assistant Research Professor	BCH 8633 Enzymes, BCH 6414 Protein Methods
Sorina Popescu	Assistant Professor	
Florencia Meyer	Associate Professor	
Plant and Soil Sciences		
Brian Baldwin	Professor	
Te Ming Tseng	Assistant Professor	
Richard Harkess	Professor	
Kambham Reddy	Research Professor	
Guihong Bi	Research Professor	
Animal and Dairy Sciences		
Jamie Larson	Associate Professor	
Caleb Lemley	Assistant Professor	
Henry Paz Manzano	Assistant Professor	
Derris Devost-Burnett	Assistant Professor	
Poultry Science		
Pratima Adhikari	Assistant Professor	
Mary Beck	Professor and Head	
Wildlife, Fisheries and Aquaculture		
Guiming Wang	Professor	
Garret Street	Assistant Professor	

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 holdings for the proposed program. In general, the academic community in the areas of computational biology and bioinformatics makes widespread use of open source repositories for software, data and tutorials, and open access journals and books, which means that there is a wealth of resources freely and readily available. Specifically, the MSSTATE library has access to the 10 top-ranked journals in the field of Mathematical and Computational Biology.

1. Bioinformatics (Open Access)
2. PLOS Computational Biology (Open Access)
3. BMC Bioinformatics (Open Access)
4. Briefings in Bioinformatics
5. Database: The Journal of Biological Databases & Curation (Open Access)
6. Journal of Theoretical Biology
7. BMC Systems Biology (Open Access)
8. GigaScience (Open Access)
9. IEEE/ACM Transactions on Computational Biology and Bioinformatics
10. Genomics, Proteomics & Bioinformatics (Open Access)

The MSU library has access to additional journals that are relevant in the field. In addition, our library has access to additional relevant resources through Ebsco Academic Search Complete, Scopus, and other databases available in the online portal of the library. Finally, students can get additional materials through interlibrary loans.

8. Describe the procedures for evaluation of the program and its effectiveness in the first six 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.

Assessment methods:
Students will be expected to conduct research and present findings throughout their work in the graduate program. Students will also identify a dissertation topic and carry out the research related to that topic. This work will be described in their dissertation and presented at their dissertation defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology. Exit surveys will be performed for all graduates to determine job placement at graduation. The graduate coordinator will track admission and retention rates, and changes in the job market need and demand nationally and within the state.

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

It is estimated that approximately 25-50 faculty at Mississippi State University will participate in the program by serving as major professor for PhD students. It is also expected that each faculty member will have approximately 1-2 students that will pursue this computational biology degree, while they also direct students in other programs. This gives 25-50 students enrolled in the program at any time. A number of other students are likely to begin the degree before having selected a major professor. It will take approximately 3-5 years to for a student to finish the program if entering immediately after completing the baccalaureate. Upon instituting the program, some students will immediately transfer from programs such as biological sciences, molecular biology, and computer science, leading to a number of graduates during the first 1-3 years of the program.

Almost all of the resources needed to offer this program already exist at MSU. MSU faculty are active in computational biology research and offer a more-than-adequate number of related courses to be used as program electives. A graduate studies committee consisting of one member from each involved College at MSU will make programmatic decisions. The only resource that will need to be added is salary for a graduate coordinator (a member of this committee, to be rotated every three years) to handle administrative tasks.

Additional Approved Electives (if not taken to fulfill other requirements):

BCH 6414 Protein Methods: 4 hours.
BCH 6713 Molecular Biology: 3 hours.
BCH 6804 Molecular Biology Methods: 4 hours.
BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BCH 8243 Molecular Biology of Plants: 3 hours.
BCH 8633 Enzymes: 3 hours.
BCH 8643 Molecular Genetics: 3 hours.
BCH 8653 Genomes and Genomics: 3 hours.
BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BIO 6133 Human Genetics: 3 hours.
BIO 6113 Evolution: 3 hours.
BIO 6143 Population Genetics: 3 hours.
BIO 6443 Bacterial Genetics: 3 hours.
BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
CSE 6163 Designing Parallel Algorithms: 3 hours.
CSE 6214 Introduction to Software Engineering: 4 hours.
CSE 6503 Database Management Systems: 3 hours.
CSE 6633 Artificial Intelligence: 3 hours.
CSE 6753 Foundations in Computation: 3 hours.
CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
CSE 8413 Visualization: 3 hours.
CSE 8673 Machine Learning: 3 hours.
CSE 8813 Theory of Computation: 3 hours.
CSE 8833 Algorithms: 3 hours.
CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8303 Advanced Immunology: 3 hours.
CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
CVM 8503 Epidemiology/Biostatistics: 3 hours.
CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8993 Functional Genomics: 3 hours.
ST 6243 Data Analysis I: 3 hours.
ST 6253 Data Analysis II: 3 hours.
ST 8214 Design and Analysis of Experiments: 4 hours.

Course Descriptions (required and elective courses)

BCH 6414 Protein Methods: 4 hours.
(Prerequisite: Coregistration in BCH 4603/6603). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of protein biochemistry

BCH 6713 Molecular Biology: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of basic molecular process such as synthesis of DNA, RNA, and protein in both prokaryotic and eukaryotic cells. Offered fall semester. (Same as GNS 6713)

BCH 6804 Molecular Biology Methods: 4 hours.
(Prerequisite:Coregistration in BCH 4613/6613). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of molecular biology. (Same as GNS 4804/6804),

BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BCH 8243 Molecular Biology of Plants: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of plant development at the molecular level. Emphasis will be placed on the influence of nucleic acid metabolism on plant development

BCH 8633 Enzymes: 3 hours.
(Prerequisites: BCH 4613/6613). Three hours lecture. A study of enzymes; their purification, classification, kinetics and mechanisms

BCH 8643 Molecular Genetics: 3 hours.
(Prerequisites: PO 3103, or BIO 3103, and Coregistration in BCH 5613/7613). Three hours lecture. Study of the gene and its expression with emphasis on structure and function in higher organisms. (Same as GNS 8643)

BCH 8653 Genomes and Genomics: 3 hours.
(Prerequisites:BCH 4113/6113 or BCH 4713/6713 or BCH 8643 or consent of instructor). Overview of genome structure and evolution with emphasis on genomics, the use of molecular biology, robotics, and advanced computational methods to efficiently study genomes. (Same as PSS 8653)

BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BIO 6133 Human Genetics: 3 hours.
(Prerequisite: BIO 1134 and BIO 1144 or BIO 2113 or consent of instructor)Three hours lecture Principles of Mendelian and molecular genetics as applied to humans. Description and causes of human genetic diseases and other anomalies. (Same as GNS 4133/6133)

BIO 6113 Evolution: 3 hours.
(Prerequisites: MA 1313 or equivalent, BIO 1134 and BIO 1144, BIO 3103 or BIO 4133). Historical development of evolutionary theory; phylogeny and systematic; historic or organic evolution; molecular and phenotypic variation in populations; genetic drift and natural selection; speciation

BIO 6143 Population Genetics: 3 hours.
(Prerequisite: Both BIO 1134 and 1144, or BIO 2113, or consent of instructor. Three hours lecture. Study of the structure of genetic variation in populations and its applications in life sciences

BIO 6443 Bacterial Genetics: 3 hours.
(Prerequisites: BCH 4603, BIO 3304 or consent of instructor). Three hours lecture. The genetics of bacteria and their viruses including: replication, rearrangement, repair, transfer, regulation, and methods of manipulation and analysis of DNA

BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CMB 8011 Graduate Seminar: 1 hour.
This course serves as an introduction to the graduate program in computational biology and will introduce students to common methods and current research in bioinformatics and computational biology.

CMB 8013 Applied Computational Biology: 3 hours.
This course focuses on the application of computational methods and tools to explore biological processes and diversity.

CSE 6163 Designing Parallel Algorithms: 3 hours.
(Prerequisites: Grade of C or better in CSE 3324 or CSE 4733/6733). Three hours lecture. Techniques for designing algorithms to take advantage efficiently of different parallel architectures. Includes techniques for parallelizing sequential algorithms and techniques for matching algorithms to architectures

CSE 6214 Introduction to Software Engineering: 4 hours.
(Prerequisite: CSE 2383 with a grade of C or better). Three hours lecture. Two hours laboratory. Introduction to software engineering; planning, requirements, analysis and specification, design; testing; debugging; maintenance; documentation. Alternative design methods, software metrics, software projecet management, reuse, and reengineering

CSE 6503 Database Management Systems: 3 hours.
(Prerequisites: CSE 2383 and CSE 2813, both with a grade of C or better). Three hours lecture. Modern database models; basic database management concepts; query languages; database

design through normalization; advanced database models; extensive development experience in a team environment

CSE 6623 Computational Biology: 3 hours.
(Prerequisite:BCH 4113/6113 or equivalent and CSE 1384 or CSE 4613/6613). Three hours lecture. Computational analysis of gene sequences and protein structures on a large scale. Algorithms for sequence alignment, structural and functional genomics, comparative genomics, and current topics

CSE 6633 Artificial Intelligence: 3 hours.
(Prerequisite:Grade of C or better in CSE 2383 and CSE 2813) Three hours lecture. Study of the computer in context with human thought processes. Heuristic programming;search programming; search strategies; knowledge representation; natural language understanding; perception; learning

CSE 6753 Foundations in Computation: 3 hours.
(Prerequisite: CSE 1213 or CSE 1233 or CSE 1273 or CSE 1284 with a grade of C or better, or permission of instructor). Three hours lecture. Foundational concepts of computational algorithm design and analysis. (No credit for student in Computer Science, Computer Engineering, or Software Engineering degree programs)

CSE 6833 Introduction to Analysis of Algorithms: 3 hours.
(Prerequisites:CSE 2383,CSE 2813, and MA 2733 with a grade of C or better). Three hours lecture. Study of complexity of algorithms and algorithm design. Tools for analyzing efficiency; design of algorithms, including recurrence, divide-and-conquer, dynamic programming and greedy algorithms

CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
(Prerequisite:CSE 4163/6163). Three hours lecture. Algorithms for distributed scientific computing; performance evaluation; scheduling and load balancing issues for scientific applications; architectural issues affecting performance

CSE 8413 Visualization: 3 hours.
(Prerequisites:CSE 4413/6413).Three hours lecture. Essential algorithms for three-dimensional rendering and modeling techniques;viewing transformations, illumination, surface modeling; methodologies for visualization of scalar and vector fields in three dimensions

CSE 8673 Machine Learning: 3 hours.
(Prerequisite: CSE 4633/6633). Three hours lecture. Introduction to machine learning, including computational learning theory, major approaches to machine learning, evaluation of models, and current research

CSE 8813 Theory of Computation: 3 hours.
(Prerequisite: CSE 3813).Three hours lecture.Study of abstract models of computation,unsolvability,complexity theory, formal grammars and parsing, and other advanced topics in theoretical computer science

CSE 8833 Algorithms: 3 hours.
(Prerequisites: CSE 4833/6833).Three hours lecture. Advanced techniques for designing and analyzing algorithms, advanced data structures, case studies, NP-completeness including reductions, approximation algorithms

CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
(Prerequisite:CSE 4833/6833).Three hours lecture. Complexity of sequential algorithms, theory of complexity, parallel algorithms

CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8303 Advanced Immunology: 3 hours.
(Prerequisite: BIO 6413 or equivalent or consent from the instructor). Three hours lecture. Advanced theory and concepts of immunology, structure and function of immune mechanisms are discussed in detail

CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
Three hours lecture. This course addresses basic principles of how the body reacts to the presence of a drug or toxin and the mathematical expression of drug residues

CVM 8503 Epidemiology/Biostatistics: 3 hours.
(Prerequisite: ST 8114) Three hours lecture. Fundamental principles of descriptive and analytical epidemiology

CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8993 Functional Genomics: 3 hours.
(Prerequisites: BCH 6713 Molecular Biology and ST 6243 Data analysis or consent of instructor). Three hours lecture. Fundamental concepts, technology, and applications of

functional genomics, such as microarray, yeast hybrid systems, and RNA inference, emphasizing experimental design, analysis, and applications in biomedical research

ST 6243 Data Analysis I: 3 hours.
(Prerequisite:MA 2743, Corequisite MA 3113). Three hours lecture. Data description and descriptive statistics, probability and probability descriptions, parametric one-sample and two-sample inference procedures, simple linear regression, one-way ANOVA. Use of SAS. (Same as MA 4243/6243)

ST 6253 Data Analysis II: 3 hours.
(Prerequisite:MA/ST 4243/6243 and MA 3113). Three hours lecture. Multiple linear regression fixed, mixed, and random effect models;block design;two-factor analysis of variance;three-factor analysis of variance; analysis of covariance. Use of SAS. (Same as MA 4253/6253)

ST 8114 Statistical Methods: 4 hours.
(Prerequisite: MA 1313). Three hours lecture. Two hours laboratory. Fall and Spring semesters. Descriptive statistics; sampling distributions; inferences for one and two populations; completely random, block, Latin square, split-plot designs; factorials; simple linear regression; chi-square tests

ST 8214 Design and Analysis of Experiments: 4 hours.
(Prerequisite: ST 8114) Three hours lecture. Three hours laboratory. Offered spring semester. Procedures in planning and analyzing experiments; simple, multiple, and curvilinear regression; factorial arrangement of treatments; confounding; fractional replication; block designs; lattices; split-plots

MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF ARTS & SCIENCES

March 26, 2019

To Whom It May Concern,

It is my pleasure to write this letter of support for the development of a computational biology interdisciplinary graduate program. A core group of faculty (Drs. Perkins, Counterman, Hoffman, and Nanduri) across four colleges (Engineering, Arts & Sciences, College of Agriculture & Life Sciences, and the Vet School) have worked together to create a wonderful proposal for graduate students at the masters and doctoral level interested in working in computational biology. The degree will be housed in the Provost's office with courses offered in the four colleges. Students will work with their major professor within the discipline itself (computer sciences, biological sciences, bio chemistry, or vet medicine) to work toward their degree plan.

Arts & Sciences is supportive of the development of this program. We look forward to working collaboratively with the Provost's Office, College of Engineering, College of Agriculture and Life Sciences, and the Vet School to assist with oversight and also to help market the program to our students. Please let us know if you need additional information.

Sincerely,

Nicole E. Rader

Nicole Rader
Associate Dean for Academic Affairs,
College of Arts & Sciences
Professor, Sociology
Mississippi State University

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

OFFICE OF THE DEAN OF ENGINEERING

Dr. Kari Babski-Reeves, CPE
Professor
kari@bagley.msstate.edu

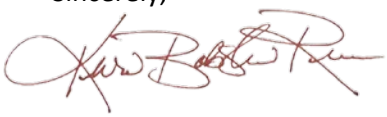
March 22, 2019

RE: Proposed Interdisciplinary Computational Biology Program

To Whom it May Concern,

I am pleased to write this letter of support for the development of a multidisciplinary graduate degree program in Computational Biology. For a number of years we have run a successful NSF REU program in this area under the direction of Andy Perkins. The popularity of this effort, as well as internal desire of students to engage in this area of endeavor illustrates a need for an educational opportunity. The Bagley College of Engineering is supportive of the development of this program housed in the Office of the Provost. The college will work with the other units involved to promote the program and provide oversight of those aspects that are under the purview of the college. If there are any additional questions or if I need to clarify anything that I've stated, please do not hesitate to let me know.

Sincerely,



Kari Babski-Reeves
Associate Dean for Research and Graduate Studies
IRB Chair

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
Box 9760
Mississippi State, MS 39762
P. 662.325.2110
cals.msstate.edu

March 27, 2019

To Whom It May Concern:

The College of Agriculture & Life Sciences fully supports the development of a multidisciplinary graduate degree program in computational biology. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Emily E. Shaw
Director of Undergraduate & Graduate Academic Advising
College of Agriculture & Life Sciences

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 26, 2019

To Whom it May Concern,

The College of Veterinary Medicine fully supports the development of multidisciplinary graduate degree program in computational biology. We appreciate the effort and dedication required to create this curriculum and are confident in its success. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Ron McLaughlin
Associate Dean for Administration
Professor of Surgery
College of Veterinary Medicine

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: Office of Academic Affairs **Department:**

Contact Person: Peter Ryan **Mail Stop: 9723** **E-mail: ryan@provost.msstate.edu**
Nature of Change: Degree addition **Date Initiated: 3/5/19** **Effective Date: Spring 2020**
Current Degree Program Name:

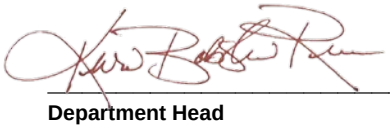
Major: **Concentration:**

New Degree Program Name: Master of Science

Major: Computational Biology **Concentration:**

Summary of Proposed Changes:
The Office of Academic Affairs, in collaboration with the College of Arts & Sciences, Bagley College of Engineering, College of Agriculture and Life Sciences, and College of Veterinary Medicine proposes a new interdisciplinary graduate program in computational biology. Students will be prepared to pursue research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

Approved: **Date:**



_____ ___4/9/2019_____

Department Head

_____ _____

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

NEW GRADUATE DEGREE OUTLINE FORM

Use the chart below to indicate your new degree outline. Please list required College and Major Required Courses and if appropriate Concentration Courses. Graduate programs that wish to specialize beyond the Major must have at least two concentrations. Add additional rows as needed for programs with more than two concentrations. Expand rows as needed

PROPOSED New Degree	
Degree: MS (non-thesis) Major: Computational Biology	
Graduate study leading to the Master of Science and Doctor of Philosophy degrees is offered in the area of computational biology. This interdisciplinary graduate program provides a firm foundation in computational methods and biological knowledge, and draws courses from various colleges to provide a flexible program of study.	
Proposed Curriculum Outline	Required Hours
Major Required Courses: Seminar: CMB 8011 Graduate Seminar in Computational Biology CMB 8013 Applied Computational Biology Computing: CSE 6623 Computational Biology CSE 6833 Introduction to Algorithms Statistics: ST 8114 Statistical Methods Life Sciences (select two from below): BCH 6713 Molecular Biology BCH 8653 Genomes and Genomics BIO 6113 Evolution BIO 6143 Population Genetics Additional approved electives	 1 3 3 3 4 6 12
Total Hours	32

- At least 13 credit hours of GPA-graded coursework must be taken at the 8000-level or higher.
- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee. At least one course at the full graduate level in computer science and at least one course at the full graduate level in the life sciences must be completed at MSU.

PROPOSED New Degree	
Degree: MS (thesis) Major: Computational Biology	
Graduate study leading to the Master of Science and Doctor of Philosophy degrees is offered in the area of computational biology. This interdisciplinary graduate program provides a firm foundation in computational methods and biological knowledge, and draws courses from various colleges to provide a flexible program of study.	
Proposed Curriculum Outline	Required Hours
Major Required Courses: Seminar: CMB 8011 Graduate Seminar in Computational Biology CMB 8013 Introduction to Computational Biology Computing: CSE 6623 Computational Biology CSE 6833 Introduction to Algorithms Statistics: ST 8114 Statistical Methods Life Sciences (select two from below): BCH 6713 Molecular Biology BCH 8653 Genomes and Genomics BIO 6713 Evolutionary Biology BIO 6143 Population Genetics Additional approved electives CMB 8000 Thesis Research	 1 3 3 3 4 6 6 6
Total Hours	32

- At least 16 credit hours of GPA-graded coursework must be taken at the 8000-level or higher.
- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee. At least one course at the full graduate level in computer science and at least one course at the full graduate level in the life sciences must be completed at MSU.

Prerequisites

CSE 2183 Discrete Structures	3
CSE 2383 Data Structures*	3

*This requirement can be satisfied by completing CSE 6753 Fundamentals of Computing with a grade of B or higher.

All undergraduate prerequisite courses listed must be satisfied. A PhD student's program of study may include 6000-level prerequisite courses.

1. Curriculum Outline

   Three new courses will be necessary and proposals have been submitted in CIM.

   CMB 8011 Graduate Seminar
   CMB 8013 Applied Computational Biology
   CMB 8000 Thesis

2. Student learning outcomes and assessment

   Learning outcomes:
   1. Graduates will be prepared to serve in computational biology research positions in academia, industry, and government.
   2. Graduates will be able to communicate effectively through scientific presentations and papers with a diverse audience of their peers in biology, molecular biology, computer science, and other areas of the computational and life sciences.
   3. Graduates will be able to postulate well-reasoned hypotheses and apply sound scientific principles, knowledge, and methods to collect and analyze data to test these hypotheses.

   Assessment methods:
   Students will be expected to conduct research and present findings throughout their work in the graduate program. Students will also identify a thesis topic and carry out the research related to that topic. This work will be described in their thesis and presented at their thesis defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Students choosing the coursework option will present a class or research project as part of their final examination, which will allow their committee to assess their proficiency in communication. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology.

3. Support

   A letter of support from the associate deans of colleges involved in the degree program is attached.

4. Proposed 4-letter abbreviation

   COMB

5. Effective date:

   Spring 2020

Appendix 7: Authorization to Plan a New Degree Program
(Submit Appendix 7 in both PDF and Word Document Formats)

Institution: Mississippi State University

Date of Implementation:	Incremental, Six Year Cost of Implementation:	Incremental, Six-Year Per Student Cost of Implementation:
May 16, 2019	$212,570	$2,501

Will it attract new students to the university?	Potential Six-Year, New Revenue:	Potential New, Six-Year Revenue Per Student:
☒ Yes ☐ No	$962,280	$11,321

Program Title as will Appear on Academic Program Inventory, Diploma, and Transcript:	Six-Digit CIP Code:
Computational Biology	26.1104

Name of Degree(s) to be Awarded:	Total Credit Hour Requirements to Earn the Degree:
Master of Science	32

List any institutions within the state offering similar programs:

None

Responsible Academic Unit(s):

Office of Academic Affairs

Institutional Contact: Dr. Peter Ryan
Phone: 662-325-0730
Email: ryan@provost.msstate.edu

Number of Students Expected to Enroll in First Six Years:		Number of Graduates Expected in First Six Years:	
Year One	5	Year One	3
Year Two	10	Year Two	5
Year Three	15	Year Three	10
Year Four	15	Year Four	15
Year Five	20	Year Five	15
Year Six	20	Year Six	20
Total	85	Total	68

Program Summary:

The interdisciplinary computational biology MS degree program will provide students the technical skills to perform computational biology work and research duties in academia, government, and industry. It will also prepare students to enter PhD studies in computational biology and related areas. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

Chief Academic Officer Signature **Date**

Institutional Executive Officer Signature **Date**

Institution:

1. Describe the proposed program and explain how it fits within the mission of the institution.

The proposed program will train students to become independent researchers in the highly interdisciplinary area of computational biology, which encompasses diverse specializations and involves faculty in almost every college in the university. This program will build upon the University's strength in the areas of genomics, evolutionary genetics, statistics, big data, machine learning, and others to offer rigorous preparation and opportunities for high-impact research. This program helps Mississippi State University fulfill its mission to enhance its strength in agriculture, engineering, and natural sciences. It also has the potential to help Mississippi State contribute to the economic development of the state by producing a workforce with the skills needed for modern biological research.

2. Provide the information used to determine Mississippi's need for this program. Be specific and provide supporting data.

While computational biology is a well-established research area, it is an emerging discipline for formal education and training in academia. Universities across the country are beginning to offer graduate and undergraduate programs in computational biology to train the next generation of scientists who will be using computational methods and big data to answer important questions in the life sciences. In the SEC, the University of Georgia offers a graduate program in Integrated Life Sciences and Vanderbilt University offers a graduate degree in Biomedical Informatics. These are degrees that offer training comparable to a computational biology program. Establishing this program at Mississippi State University will ensure that Mississippi is a leader in the South in producing computational biologists.

The primary need for this program is indicated by the research interests of faculty at Mississippi State University. Researchers have found that answering key questions about life often requires the use of new technologies and the collection of massive amounts of data. These new technologies have driven what has been termed the "big data revolution" in science, which has necessitated computational approaches in almost all areas of the life sciences. Those on the forefront are already using the educational infrastructure and skills of the faculty at Mississippi State to produce graduates that are well-prepared in these areas. The proposed degree program will allow students to earn the credential (MS in Computational Biology) that is most closely aligned with their expertise and interests. This degree will often allow graduates to pursue positions that might not have been available with a degree in the life sciences, or positions that will have a significantly higher pay rate.

There is a need for computational biology researchers within Mississippi. Several research labs and institutes across the state conduct research in computational biology, including the University of

Mississippi Medical Center, USDA-Agricultural Research Service (ARS), US Forest Products Lab, and the US Army Corps of Engineers Engineer Research and Development Center (ERDC). Many Mississippi State University graduates have gone on to positions with these organizations.

As we continue to produce highly-skilled graduates in computational biology, Mississippi will become more attractive to genomics, biotechnology, and pharmaceutical industries. Surrounding states such as Alabama and Tennessee have recently been able to attract such industries.

3. Provide information on employment (supporting data must include state and national employment statistics or career opportunities (include potential earnings range).

Graduates of this program will go on to research positions in academic labs, industry, and government. Prior Mississippi State University graduates that would have been potential candidates for this degree program have pursued positions such as bioinformatician at a medical school, a computation specialist at a genomics facility, and a forensic biologist with the state government.

Graduates of this program would also have the necessary background to pursue a PhD degree in one or more of the areas of computational biology, bioinformatics, biological sciences, molecular biology, or others. Graduates would likely be sought after for postsecondary instructor positions in these areas at universities and community colleges.

As of May 14, 2018 over 100 jobs in the area of computational biology had been posted at the International Society for Computational Biology (ISCB) web site within the past three months, the premier international professional organization for computational biologists. Many more jobs requiring the skills of computational biologists are regularly posted to the Association for Computing Machinery, Computing Research Association, Academic Keys, and other employment sites.

According to the Mississippi Department of Employment Security occupational projections, the need for postsecondary teachers in the biological sciences is expected to grow by over 17% by 2024, and computer science postsecondary teachers by over 11%. These jobs pay on average $72,000-$79,000. However, employment in biological sciences positions (paying on average approximately $77,000) is expected to primarily remain steady or even drop slightly over this period. The proposed program has the potential to provide trained scientists to fill positions in Mississippi and possibly attract additional industry to the state, alleviating this concern.

4. Describe any other benefits to the institution, state, region, or nation including research, service, and teaching efforts that might result from offering this program.

Many faculty members likely to be involved in this program have a record of outreach to K-12 students and teachers. For example, Dr. Nanduri (Basic Sciences, College of Veterinary Medicine) and Dr. Perkins (Computer Science, Bagley College of Engineering) have helped to instruct workshops of Mississippi teachers in the area of computational biology. Dr. Hoffmann (Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture and Life Sciences) and Dr. Perkins have received funding from Mississippi State University to instruct undergraduate and high school students in construction, administration, and use of clusters of miniature portable computers for genomics research.

Drs. King (Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture

and Life Sciences), Nanduri, and Perkins have each pursued federal grants for training graduate students in this area. The establishment of this degree program will make Mississippi more competitive for these grant funds, which would attract students from around the region and the country to graduate studies in Mississippi.

5. Using expected enrollment, provide the total anticipated budget for the program including implementation and 5 subsequent years (total of 6 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
2019-2020	5	5	$0	$31,251	$41,580	$0	$(10,329)
2020-2021	10	7	$0	$32,814	$56,808	$0	$(28,098)
2021-2022	15	17	$0	$34,455	$132,948	$0	$(102,597)
2022-2023	15	2	$0	$36,177	$167,508	$0	$(142,455)
2023-2024	20	32	$0	$37,986	$243,648	$0	$(216,786)
2024-2025	20	42	$0	$39,886	$319,788	$0	$(249,446)
TOTAL		125	$0	$212,570	$962,280	$0	$(749,710)

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

Start-Up Costs: one-time costs associated with offering this program

Direct, Incremental Costs: additional annual costs to the university as a result of offering this program

Incremental Revenue: additional annual revenue assuming that this program will bring in new students paying full tuition

Non-Tuition Revenue: external funds, grants, contracts or other revenues attributable to the addition of this program

Differential: all revenues minus all costs

Enrollment estimates assume 3 students graduate after the first year of the program, increasing to 5 during years 2, 10 after year 3, up to 15 after year 4 and 5, and 20 after year 6. Additional annual costs include 12.5% salary release for a graduate coordinator annually, and half the cost of offering an additional section of CSE 6833 Introduction to Algorithms (shared with the PhD program) including fringes, assuming 9-month salary of $100,000. Additional annual revenue includes tuition from enrolled students (50% out of state).

Almost all of the resources needed to offer this program already exist at MSU. MSU faculty are active in computational biology research and offer a more-than-adequate number of related courses to be used as program electives. A graduate studies committee consisting of one member from each involved College at MSU will make programmatic decisions. The only resource that will need to be added is salary for a graduate coordinator (a member of this committee, to be rotated every three years) to handle administrative tasks.

6. Indicate where the proposed program is offered within the state and explain anticipated consequences on enrollment in other institutions offering the program, including any ramifications on the Ayers settlement.

There are no institutions in Mississippi offering the proposed program.

7. What is the specific basis for determining the number of graduates expected in the first six years?

It is estimated that approximately 25 faculty at Mississippi State University will participate in the program by serving as major professor for MS students. It is also expected that each faculty member will have approximately 2-3 students that will pursue this computational biology degree (including both thesis and non-thesis tracks), while they also direct students in other programs. This gives 25-50 students enrolled in the program at any time. A number of other students are likely to begin the degree before having selected a major professor. It will take approximately 2 years to for a student to finish the program if entering immediately after completing the baccalaureate. Upon instituting the program, some students will immediately transfer from programs such as biological sciences, molecular biology, and computer science, leading to a number of graduates during the first year of the program.

Appendix 8: New Degree Program Proposal
(Submit Appendix 8 in both PDF and Word Document Formats)

Institution:

Date of Implementation:	**Incremental, Six-Year Cost of Implementation:**	**Incremental, Six-Year Per Student Cost of Implementation:**
Spring 2020	$212,570	$2,501

Will it attract new students to the university? ☒ **Yes** ☐ **No**	**Potential Six-Year, New Revenue:**	**Potential New, Six-Year Revenue Per Student:**
	$962,280	**$11,321**

Program Title as will Appear on Academic Program Inventory, Diploma, and Transcript:	**Six-Digit CIP Code:**
Computational Biology	26.1104

Name of Degree(s) to be Awarded:	**Total Credit Hour Requirements to earn the degree:**
Mater of Science	32

List any institutions within the state offering similar programs:

None

Responsible Academic Unit(s):	**Institutional Contact: Dr. Peter Ryan**
	Phone: 662-325-0730
Office of Academic Affairs	**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 Six Years:		**Number of Graduates Expected in First Six Years:**	
Year One	5	**Year One**	3
Year Two	10	**Year Two**	5
Year Three	15	**Year Three**	10
Year Four	15	**Year Four**	15
Year Five	20	**Year Five**	15
Year Six	20	**Year Six**	20
Total	85	**Total**	68

Program Summary:

The interdisciplinary computational biology MS degree program will prepare students for research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

_____ _____

Chief Academic Officer Signature **Date**

Institutional Executive Officer Signature **Date**

Institution:

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.

A graduate studies committee will be formed consisting of one full-time tenured or tenue-track faculty from each college participating in the program. A college will be determined to be participating in the program if one of its faculty members is serving as major professor for a student in the program, or if one of its faculty members teaches a course that is required for the degree. Initially, committee membership will consist of:

Dr. Brian Counterman, Associate Professor, Department of Biological Sciences, College of Arts and Sciences

Dr. Federico Hoffmann, Associate Professor, Department of Biochemistry, Molecular Biology, Entomology & Plant Pathology, College of Agriculture and Life Sciences

Dr. Bindu Nanduri, Associate Professor, Department of Basic Sciences, College of Veterinary Medicine

Dr. Andy Perkins, Associate Professor, Department of Computer Science and Engineering, Bagley College of Engineering

This committee will be responsible for making admissions decisions, as well as programmatic decisions. The committee will also hear student petitions, approve or disapprove requirements completed at other institutions, and decide on other matters on a case-by-case basis. The committee will also be responsible for maintaining the curriculum and keeping it current.

The committee will select one of its members to serve as graduate coordinator. Initially graduate coordinator duties will be fulfilled by both Drs. Counterman and Perkins. The graduate coordinator will serve a three-year term after which a different committee member will serve as graduate coordinator. The graduate coordinator will be responsible for the logistics of handling applications for admission, admitting students, communicating and soliciting decisions from the committee, meeting with prospective and current students, and advising any students that have not yet selected a major professor.

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

Learning outcomes:

1. Graduates will be prepared to serve in computational biology research positions in academia, industry, and government.
2. Graduates will be able to communicate effectively through scientific presentations and papers with a diverse audience of their peers in biology, molecular biology, computer science, and other areas of the computational and life sciences.
3. Graduates will be able to postulate well-reasoned hypotheses and apply sound scientific principles, knowledge, and methods to collect and analyze data to test these hypotheses.

Assessment methods:
Students will be expected to conduct research and present findings throughout their work in the graduate program. Students will also identify a thesis topic and carry out the research related to that topic. This work will be described in their thesis and presented at their thesis defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Students choosing the coursework option will present a class or research project as part of their final examination, which will allow their committee to assess their proficiency in communication. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology.

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

There are no special admission requirements for the degree program. The program has two prerequisite courses (CSE 2383 Data Structures and CSE 2813 Discrete Structures), but these prerequisite courses may be taken simultaneously with graduate-level coursework after admission into the program. Admission into the program will be determined by a vote of the Graduate Studies Committee.

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.

No professional accreditation is currently available or will be sought for this program.

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.

a. Coursework

Students will complete a minimum of 26 hours of coursework and 6 hours of thesis research. Students pursuing a non-thesis degree will take 32 hours of coursework.

Major Required Courses:

CMB 8011 Graduate Seminar	1
CMB 8013 Advanced Computational Biology	3
CSE 6623 Computational Biology	3
CSE 6833 Algorithms	3
Statistics:	
ST 8114 Statistical Methods	4
Life Sciences (Select two): BCH 6713 Molecular Biology BCH 8653 Genomes and Genomics BIO 6113 Evolution BIO 6143 Population Genetics	6
Additional Approved Electives	6
Thesis:	
CMB 8000	6
Total	32

- At least 13 credit hours of GPA-graded coursework must be taken at the 8000-level or higher for thesis students, and at least 16 credit hours of GPA-graded coursework must be taken at the 8000-level or higher for non-thesis students.
- Graduate courses completed as part of a master's degree or graduate courses completed prior to entry into the MS program may, when approved by the student's graduate committee, be applied to the MS degree requirements. The committee's decision will be documented by an "Attachment Sheet for Program of Study" form. The program of study will cover remaining coursework requirements.
- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee. At least one course at the full graduate level must be taken in computer science and at least one course at the full graduate level in the life sciences must be taken at MSU.
- All undergraduate prerequisite courses must be satisfied. A MS student's program of study may include 6000-level prerequisite courses.
- **Students pursuing the non-thesis track will substitute an additional 6 credit hours of Additional Approved Electives in place of the GRD 8000 Thesis house.**

b. Thesis Proposal (thesis track only)

The thesis proposal provides the student with the opportunity to formally present his/her thesis proposal to the Graduate Committee. This proposal should be scheduled at least one semester prior to the semester in which the student plans to graduate. The proposal also allows for questioning by the Committee to clarify the objectives of the proposal, and allows for adjustment of objectives until agreement is reached between the student and the Graduate Committee.

The student will submit a written proposal to the graduate committee at least one week prior to the oral presentation. The format of the proposal shall conform to the University's Standard for Preparing Theses and Dissertations

The presentation shall consist of an oral presentation of the thesis proposal that is open to the student's graduate committee only. At this time, the student and his/her Committee may negotiate specific changes in the proposed work.

The written proposal should contain a literature review in the proposed research area, a clear thesis statement, a description of the significance of the proposed area to the field, a proposed procedure for the conduct of the research and publication plan. The acceptability of the proposal will be determined by the Committee.

c. Thesis (thesis track only)

As required by the Graduate School, all candidates for the PhD degree in Computational Biology must submit a thesis that exhibits mastery of the techniques of research and a distinct contribution to the field under investigation and study. The student's graduate committee must approve the thesis topic, the outline, and both the initial and final submissions to the Library.

d. Thesis Defense/Final Examination

The final examination is an oral defense of the thesis that is open to the public. There is an open question period that is open to the public, and a closed question period open only to the candidate and the graduate committee. The examination will cover the research related to the thesis. The acceptability of the thesis will be determined by the graduate committee.

For non-thesis track students, the final examination will consist of a presentation on a class project or other research topic, followed by a question period covering the presentation and all graduate-level coursework.

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 in order to begin the program, give the desired qualifications of the persons to be added.

All of the faculty necessary to teach program courses, mentor students, and direct research are already present at MSU. The faculty below are expected to be available to advise students. All of these faculty are full-time instructional or research faculty at MSU. Some of the faculty will teach courses that are either required for or will be accepted as electives for the degree. In those cases, the relevant courses are listed.

Name	**Rank**	**Courses taught**
Biological Sciences		
Matthew Brown	Assistant Professor	
Matthew Ballinger	Assistant Professor	BIO 6990 Evolution of Infectious Diseases
Brian Counterman	Associate Professor	GRD 8013 Applied Computational Biology
Amy Dapper	Assistant Professor	BIO 6113 Evolution
Angus Dawe	Professor and Head	
Jean-Francois Gout	Assistant Professor	BIO 6143 Population Genetics
Heather Jordan	Assistant Professor	BIO 6990 Microbial Ecology
Ling Li	Assistant Professor	BIO 6990 Plant Data Resources
Mark Welch	Associate Professor	BIO 6113 Evolution
Chemistry		
Nick Fitzkee	Associate Professor	
Steven Gwaltney	Professor	
Charles Webster	Professor	
Computer Science and Engineering		
Andy Perkins	Associate Professor	CSE 6623 Computational Biology
John Swan	Professor	CSE 8990 Visualization with R
TJ Jankun-Kelly	Associate Professor	CSE 8413 Visualization
Mahalingam Ramkumar	Associate Professor	
Agricultural and Biological Engineering		
Lauren Priddy	Assistant Professor	
Raj Prabhu	Assistant Professor	
Electrical and Computer Engineering		

Bo Tang	Assistant Professor	
John Ball	Assistant Professor	
Basic Sciences, College of Veterinary Medicine		
Russell Carr	Associate Professor	
Larry Hanson	Professor	
Attila Karsi	Associate Professor	
Mark Lawrence	Professor	
Bindu Nanduri	Associate Professor	CVM 8993 Functional Genomics
Clinical Sciences, College of Veterinary Medicine		
Cyprianna Swiderski	Associate Professor	
Pathobiology and Population Medicine, College of Veterinary Medicine		
Amelia Woolums	Professor	
Institute for Genomics, Biocomputing and Biotechnology		
Daniel Peterson	Professor and Director	BCH 8653 Genomes and Genomics
George Popescu	Assistant Research Professor	BCH 8990 Systems Biology
Biochemistry, Molecular Biology, Entomology and Plant Pathology		
Federico Hoffmann	Associate Professor	GRD 8011 Seminar
Jonas King	Assistant Professor	BCH 6990 Introduction to Public Health
Jeffrey Dean	Professor and Head	
Shien Lu	Professor	
Zhaohua Peng	Professor	BCH 6713 Molecular Biology
Xueyan Shan	Assistant Research Professor	BCH 8633 Enzymes, BCH 6414 Protein Methods
Sorina Popescu	Assistant Professor	
Florencia Meyer	Associate Professor	
Plant and Soil Sciences		
Brian Baldwin	Professor	
Te Ming Tseng	Assistant Professor	
Richard Harkess	Professor	
Kambham Reddy	Research Professor	
Guihong Bi	Research Professor	
Animal and Dairy Sciences		
Jamie Larson	Associate Professor	
Caleb Lemley	Assistant Professor	
Henry Paz Manzano	Assistant Professor	
Derris Devost-Burnett	Assistant Professor	
Poultry Science		
Pratima Adhikari	Assistant Professor	

Mary Beck	Professor and Head	
Wildlife, Fisheries and Aquaculture		
Guiming Wang	Professor	
Garret Street	Assistant Professor	

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 holdings for the proposed program. In general, the academic community in the areas of computational biology and bioinformatics makes widespread use of open source repositories for software, data and tutorials, and open access journals and books, which means that there is a wealth of resources freely and readily available. Specifically, the MSSTATE library has access to the 10 top-ranked journals in the field of Mathematical and Computational Biology.

1. Bioinformatics (Open Access)
2. PLOS Computational Biology (Open Access)
3. BMC Bioinformatics (Open Access)
4. Briefings in Bioinformatics
5. Database: The Journal of Biological Databases & Curation (Open Access)
6. Journal of Theoretical Biology
7. BMC Systems Biology (Open Access)
8. GigaScience (Open Access)
9. IEEE/ACM Transactions on Computational Biology and Bioinformatics
10. Genomics, Proteomics & Bioinformatics (Open Access)

The MSU library has access to additional journals that are relevant in the field. In addition, our library has access to additional relevant resources through Ebsco Academic Search Complete, Scopus, and other databases available in the online portal of the library. Finally, students can get additional materials through interlibrary loans.

8. Describe the procedures for evaluation of the program and its effectiveness in the first six 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.

Assessment methods:
Students will be expected to conduct research and present findings throughout their work in the graduate program. Students choosing the thesis track will also identify a thesis topic and carry out the research related to that topic. This work will be described in their thesis and presented at their thesis defense. Each student's committee members will complete an evaluation form assessing the student's effectiveness in their communication and research skills. Students choosing the coursework option will present a class or research project as part of their final examination, which will allow their committee to assess their proficiency in communication. Graduates will also be tracked after graduation to determine whether they were employed in research positions in computational biology. Exit surveys will be performed for all graduates to determine job placement at graduation. The graduate coordinator will track admission and retention rates, and changes in the job market need and demand nationally and within the state.

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

It is estimated that approximately 25-50 faculty at Mississippi State University will participate in the program by serving as major professor for MS students. It is also expected that each faculty member will have approximately 1-2 students that will pursue this computational biology degree (including both thesis and non-thesis tracks), while they also direct students in other programs. This gives 25-50 students enrolled in the program at any time. A number of other students are likely to begin the degree before having selected a major professor. It will take approximately 2 years to for a student to finish the program if entering immediately after completing the baccalaureate. Upon instituting the program, some students will immediately transfer from programs such as biological sciences, molecular biology, and computer science, leading to a number of graduates during the first year of the program.

Additional Approved Electives (if not taken to fulfill other requirements):

BCH 6414 Protein Methods: 4 hours.
BCH 6713 Molecular Biology: 3 hours.
BCH 6804 Molecular Biology Methods: 4 hours.
BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BCH 8243 Molecular Biology of Plants: 3 hours.
BCH 8633 Enzymes: 3 hours.
BCH 8643 Molecular Genetics: 3 hours.
BCH 8653 Genomes and Genomics: 3 hours.
BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BIO 6133 Human Genetics: 3 hours.
BIO 6113 Evolution: 3 hours.
BIO 6143 Population Genetics: 3 hours.
BIO 6443 Bacterial Genetics: 3 hours.
BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
CSE 6163 Designing Parallel Algorithms: 3 hours.
CSE 6214 Introduction to Software Engineering: 4 hours.
CSE 6503 Database Management Systems: 3 hours.
CSE 6633 Artificial Intelligence: 3 hours.
CSE 6753 Foundations in Computation: 3 hours.
CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
CSE 8413 Visualization: 3 hours.
CSE 8673 Machine Learning: 3 hours.
CSE 8813 Theory of Computation: 3 hours.
CSE 8833 Algorithms: 3 hours.
CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8303 Advanced Immunology: 3 hours.
CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
CVM 8503 Epidemiology/Biostatistics: 3 hours.
CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8993 Functional Genomics: 3 hours.
ST 6243 Data Analysis I: 3 hours.
ST 6253 Data Analysis II: 3 hours.
ST 8214 Design and Analysis of Experiments: 4 hours.

Course Descriptions (required and elective courses)

BCH 6414 Protein Methods: 4 hours.
(Prerequisite: Coregistration in BCH 4603/6603). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of protein biochemistry

BCH 6713 Molecular Biology: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of basic molecular process such as synthesis of DNA, RNA, and protein in both prokaryotic and eukaryotic cells. Offered fall semester. (Same as GNS 6713)

BCH 6804 Molecular Biology Methods: 4 hours.
(Prerequisite:Coregistration in BCH 4613/6613). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of molecular biology. (Same as GNS 4804/6804),

BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BCH 8243 Molecular Biology of Plants: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of plant development at the molecular level. Emphasis will be placed on the influence of nucleic acid metabolism on plant development

BCH 8633 Enzymes: 3 hours.
(Prerequisites: BCH 4613/6613). Three hours lecture. A study of enzymes; their purification, classification, kinetics and mechanisms

BCH 8643 Molecular Genetics: 3 hours.
(Prerequisites: PO 3103, or BIO 3103, and Coregistration in BCH 5613/7613). Three hours lecture. Study of the gene and its expression with emphasis on structure and function in higher organisms. (Same as GNS 8643)

BCH 8653 Genomes and Genomics: 3 hours.
(Prerequisites:BCH 4113/6113 or BCH 4713/6713 or BCH 8643 or consent of instructor). Overview of genome structure and evolution with emphasis on genomics, the use of molecular biology, robotics, and advanced computational methods to efficiently study genomes. (Same as PSS 8653)

BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BIO 6133 Human Genetics: 3 hours.
(Prerequisite: BIO 1134 and BIO 1144 or BIO 2113 or consent of instructor)Three hours lecture Principles of Mendelian and molecular genetics as applied to humans. Description and causes of human genetic diseases and other anomalies. (Same as GNS 4133/6133)

BIO 6113 Evolution: 3 hours.
(Prerequisites: MA 1313 or equivalent, BIO 1134 and BIO 1144, BIO 3103 or BIO 4133). Historical development of evolutionary theory; phylogeny and systematic; historic or organic evolution; molecular and phenotypic variation in populations; genetic drift and natural selection; speciation

BIO 6143 Population Genetics: 3 hours.
(Prerequisite: Both BIO 1134 and 1144, or BIO 2113, or consent of instructor. Three hours lecture. Study of the structure of genetic variation in populations and its applications in life sciences

BIO 6443 Bacterial Genetics: 3 hours.
(Prerequisites: BCH 4603, BIO 3304 or consent of instructor). Three hours lecture. The genetics of bacteria and their viruses including: replication, rearrangement, repair, transfer, regulation, and methods of manipulation and analysis of DNA

BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CMB 8011 Graduate Seminar: 1 hour.
This course serves as an introduction to the graduate program in computational biology and will introduce students to common methods and current research in bioinformatics and computational biology.

CMB 8013 Applied Computational Biology: 3 hours.
This course focuses on the application of computational methods and tools to explore biological processes and diversity.

CSE 6163 Designing Parallel Algorithms: 3 hours.
(Prerequisites: Grade of C or better in CSE 3324 or CSE 4733/6733). Three hours lecture. Techniques for designing algorithms to take advantage efficiently of different parallel architectures. Includes techniques for parallelizing sequential algorithms and techniques for matching algorithms to architectures

CSE 6214 Introduction to Software Engineering: 4 hours.
(Prerequisite: CSE 2383 with a grade of C or better). Three hours lecture. Two hours laboratory. Introduction to software engineering; planning, requirements, analysis and specification, design; testing; debugging; maintenance; documentation. Alternative design methods, software metrics, software projecet management, reuse, and reengineering

CSE 6503 Database Management Systems: 3 hours.
(Prerequisites: CSE 2383 and CSE 2813, both with a grade of C or better). Three hours lecture. Modern database models; basic database management concepts; query languages; database

design through normalization; advanced database models; extensive development experience in a team environment

CSE 6623 Computational Biology: 3 hours.
(Prerequisite:BCH 4113/6113 or equivalent and CSE 1384 or CSE 4613/6613). Three hours lecture. Computational analysis of gene sequences and protein structures on a large scale. Algorithms for sequence alignment, structural and functional genomics, comparative genomics, and current topics

CSE 6633 Artificial Intelligence: 3 hours.
(Prerequisite:Grade of C or better in CSE 2383 and CSE 2813) Three hours lecture. Study of the computer in context with human thought processes. Heuristic programming;search programming; search strategies; knowledge representation; natural language understanding; perception; learning

CSE 6753 Foundations in Computation: 3 hours.
(Prerequisite: CSE 1213 or CSE 1233 or CSE 1273 or CSE 1284 with a grade of C or better, or permission of instructor). Three hours lecture. Foundational concepts of computational algorithm design and analysis. (No credit for student in Computer Science, Computer Engineering, or Software Engineering degree programs)

CSE 6833 Introduction to Analysis of Algorithms: 3 hours.
(Prerequisites:CSE 2383,CSE 2813, and MA 2733 with a grade of C or better). Three hours lecture. Study of complexity of algorithms and algorithm design. Tools for analyzing efficiency; design of algorithms, including recurrence, divide-and-conquer, dynamic programming and greedy algorithms

CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
(Prerequisite:CSE 4163/6163). Three hours lecture. Algorithms for distributed scientific computing; performance evaluation; scheduling and load balancing issues for scientific applications; architectural issues affecting performance

CSE 8413 Visualization: 3 hours.
(Prerequisites:CSE 4413/6413).Three hours lecture. Essential algorithms for three-dimensional rendering and modeling techniques;viewing transformations, illumination, surface modeling; methodologies for visualization of scalar and vector fields in three dimensions

CSE 8673 Machine Learning: 3 hours.
(Prerequisite: CSE 4633/6633). Three hours lecture. Introduction to machine learning, including computational learning theory, major approaches to machine learning, evaluation of models, and current research

CSE 8813 Theory of Computation: 3 hours.
(Prerequisite: CSE 3813).Three hours lecture.Study of abstract models of computation,unsolvability,complexity theory, formal grammars and parsing, and other advanced topics in theoretical computer science

CSE 8833 Algorithms: 3 hours.
(Prerequisites: CSE 4833/6833).Three hours lecture. Advanced techniques for designing and analyzing algorithms, advanced data structures, case studies, NP-completeness including reductions, approximation algorithms

CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
(Prerequisite:CSE 4833/6833).Three hours lecture. Complexity of sequential algorithms, theory of complexity, parallel algorithms

CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8303 Advanced Immunology: 3 hours.
(Prerequisite: BIO 6413 or equivalent or consent from the instructor). Three hours lecture. Advanced theory and concepts of immunology, structure and function of immune mechanisms are discussed in detail

CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
Three hours lecture. This course addresses basic principles of how the body reacts to the presence of a drug or toxin and the mathematical expression of drug residues

CVM 8503 Epidemiology/Biostatistics: 3 hours.
(Prerequisite: ST 8114) Three hours lecture. Fundamental principles of descriptive and analytical epidemiology

CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8993 Functional Genomics: 3 hours.
(Prerequisites: BCH 6713 Molecular Biology and ST 6243 Data analysis or consent of instructor). Three hours lecture. Fundamental concepts, technology, and applications of

functional genomics, such as microarray, yeast hybrid systems, and RNA inference, emphasizing experimental design, analysis, and applications in biomedical research

ST 6243 Data Analysis I: 3 hours.
(Prerequisite:MA 2743, Corequisite MA 3113). Three hours lecture. Data description and descriptive statistics, probability and probability descriptions, parametric one-sample and two-sample inference procedures, simple linear regression, one-way ANOVA. Use of SAS. (Same as MA 4243/6243)

ST 6253 Data Analysis II: 3 hours.
(Prerequisite:MA/ST 4243/6243 and MA 3113). Three hours lecture. Multiple linear regression fixed, mixed, and random effect models;block design;two-factor analysis of variance;three-factor analysis of variance; analysis of covariance. Use of SAS. (Same as MA 4253/6253)

ST 8114 Statistical Methods: 4 hours.
(Prerequisite: MA 1313). Three hours lecture. Two hours laboratory. Fall and Spring semesters. Descriptive statistics; sampling distributions; inferences for one and two populations; completely random, block, Latin square, split-plot designs; factorials; simple linear regression; chi-square tests

ST 8214 Design and Analysis of Experiments: 4 hours.
(Prerequisite: ST 8114) Three hours lecture. Three hours laboratory. Offered spring semester. Procedures in planning and analyzing experiments; simple, multiple, and curvilinear regression; factorial arrangement of treatments; confounding; fractional replication; block designs; lattices; split-plots

MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF ARTS & SCIENCES

March 26, 2019

To Whom It May Concern,

It is my pleasure to write this letter of support for the development of a computational biology interdisciplinary graduate program. A core group of faculty (Drs. Perkins, Counterman, Hoffman, and Nanduri) across four colleges (Engineering, Arts & Sciences, College of Agriculture & Life Sciences, and the Vet School) have worked together to create a wonderful proposal for graduate students at the masters and doctoral level interested in working in computational biology. The degree will be housed in the Provost's office with courses offered in the four colleges. Students will work with their major professor within the discipline itself (computer sciences, biological sciences, bio chemistry, or vet medicine) to work toward their degree plan.

Arts & Sciences is supportive of the development of this program. We look forward to working collaboratively with the Provost's Office, College of Engineering, College of Agriculture and Life Sciences, and the Vet School to assist with oversight and also to help market the program to our students. Please let us know if you need additional information.

Sincerely,

Nicole E. Rader

Nicole Rader
Associate Dean for Academic Affairs,
College of Arts & Sciences
Professor, Sociology
Mississippi State University

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

OFFICE OF THE DEAN OF ENGINEERING

Dr. Kari Babski-Reeves, CPE
Professor
kari@bagley.msstate.edu

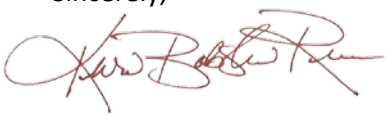
March 22, 2019

RE: Proposed Interdisciplinary Computational Biology Program

To Whom it May Concern,

I am pleased to write this letter of support for the development of a multidisciplinary graduate degree program in Computational Biology. For a number of years we have run a successful NSF REU program in this area under the direction of Andy Perkins. The popularity of this effort, as well as internal desire of students to engage in this area of endeavor illustrates a need for an educational opportunity. The Bagley College of Engineering is supportive of the development of this program housed in the Office of the Provost. The college will work with the other units involved to promote the program and provide oversight of those aspects that are under the purview of the college. If there are any additional questions or if I need to clarify anything that I've stated, please do not hesitate to let me know.

Sincerely,



Kari Babski-Reeves
Associate Dean for Research and Graduate Studies
IRB Chair

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
Box 9760
Mississippi State, MS 39762
P. 662.325.2110
cals.msstate.edu

March 27, 2019

To Whom It May Concern:

The College of Agriculture & Life Sciences fully supports the development of a multidisciplinary graduate degree program in computational biology. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Emily E. Shaw
Director of Undergraduate & Graduate Academic Advising
College of Agriculture & Life Sciences

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 26, 2019

To Whom it May Concern,

The College of Veterinary Medicine fully supports the development of multidisciplinary graduate degree program in computational biology. We appreciate the effort and dedication required to create this curriculum and are confident in its success. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Ron McLaughlin
Associate Dean for Administration
Professor of Surgery
College of Veterinary Medicine

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: Office of Academic Affairs **Department:**

Contact Person: Peter Ryan **Mail Stop: 9723** **E-mail: ryan@provost.msstate.edu**
Nature of Change: Minor addition **Date Initiated: 3/5/19** **Effective Date: Spring 2020**
Current Degree Program Name:

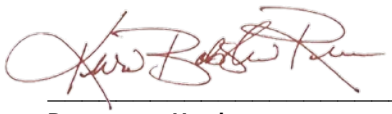
Major: **Concentration:**

New Degree Program Name: Graduate Minor

Major: Computational Biology **Concentration:**

Summary of Proposed Changes:
The Office of Academic Affairs, in collaboration with the College of Arts & Sciences, Bagley College of Engineering, College of Agriculture and Life Sciences, and College of Veterinary Medicine proposes a new interdisciplinary graduate program in computational biology. Students will be prepared to pursue research positions in academia, government, and industry. Students will complete rigorous preparation in computer science, the life sciences, and statistics, and work with faculty from across campus on research at the intersection of these areas. This program will build upon the significant computational biology work currently being done at Mississippi State and will leverage resources already available in terms of faculty, classes, and facilities.

Approved: **Date:**



_____ ___4/9/2019_____

Department Head

_____ _____

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

NEW GRADUATE DEGREE OUTLINE FORM

Use the chart below to indicate your new degree outline. Please list required College and Major Required Courses and if appropriate Concentration Courses. Graduate programs that wish to specialize beyond the Major must have at least two concentrations. Add additional rows as needed for programs with more than two concentrations. Expand rows as needed

PROPOSED New Degree	
Degree: Graduate minor Major: Computational Biology	
Graduate study leading to a minor in the area of computational biology. This interdisciplinary graduate minor provides a solid basis in computational approaches and biological knowledge. Courses are drawn from various colleges to provide a broad perspective.	
Proposed Curriculum Outline	Required Hours
Major Required Courses:	
CMB 8013 Applied Computational Biology	3
Computing:	
CSE 6623 Computational Biology	3
CSE 6833 Introduction to Algorithms	3
Statistics:	
ST 8114 Statistical Methods	3
Life Sciences (select one from below): BCH 6713 Molecular Biology BCH 8653 Genomes and Genomics BIO 6113 Evolution BIO 6143 Population Genetics	3
Additional approved elective	3
Total Hours	18

- At least 9 credit hours of GPA-graded coursework must be taken at the 8000-level or higher.
- Graduate courses completed as part of a master's degree or graduate courses completed prior to entry into the MS or PhD program may, when approved by the student's graduate committee, be applied to the minor requirements. The committee's decision will be documented by an "Attachment Sheet for Program of Study" form. The program of study will cover remaining coursework requirements.
- A student that has taken any of the above courses for undergraduate credit may use the undergraduate course to meet the graduate requirement and substitute another graduate-level course approved by the student's graduate committee.

Prerequisites

CSE 2183 Discrete Structures	3
CSE 2383 Data Structures*	3

*This requirement can be satisfied by completing CSE 6753 Fundamentals of Computing with a grade of B or higher.

All undergraduate prerequisite courses listed must be satisfied. A PhD student's program of study may include

6000-level prerequisite courses.

1. Curriculum Outline

   One new course will be necessary, and a proposal has been submitted as part of the MS/PhD program in computational biology.

   CMB 8013 Applied Computational Biology

2. Student learning outcomes and assessment

   a. Graduates will be prepared to apply computational biology and bioinformatics tools and techniques to answer research questions in biology, molecular biology, computer science, veterinary medicine, and other related areas.

   b. Graduates will be able to communicate effectively through scientific presentations and papers with a diverse audience of their peers in biology, molecular biology, computer science, veterinary medicine, and other areas of the computational and life sciences.

   Students will complete a minor exam in which their graduate committee members will ensure proper knowledge of bioinformatics tools and techniques. As part of this exam, students will give a presentation on a class project or research topic from which the committee can assess their proficiency in communication. Students will also participate in team projects and give presentations as part of the required coursework.

3. Support

   A letter of support from the associate deans of colleges involved in the degree program is attached.

4. Proposed 4-letter abbreviation

   COMB

5. Effective date:

   Spring 2020

Additional Approved Electives (if not taken to fulfill other requirements):

BCH 6414 Protein Methods: 4 hours.
BCH 6713 Molecular Biology: 3 hours.
BCH 6804 Molecular Biology Methods: 4 hours.
BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BCH 8243 Molecular Biology of Plants: 3 hours.
BCH 8633 Enzymes: 3 hours.
BCH 8643 Molecular Genetics: 3 hours.
BCH 8653 Genomes and Genomics: 3 hours.
BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
BIO 6133 Human Genetics: 3 hours.
BIO 6113 Evolution: 3 hours.
BIO 6143 Population Genetics: 3 hours.
BIO 6443 Bacterial Genetics: 3 hours.
BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
CSE 6163 Designing Parallel Algorithms: 3 hours.
CSE 6214 Introduction to Software Engineering: 4 hours.
CSE 6503 Database Management Systems: 3 hours.
CSE 6633 Artificial Intelligence: 3 hours.
CSE 6753 Foundations in Computation: 3 hours.
CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
CSE 8413 Visualization: 3 hours.
CSE 8673 Machine Learning: 3 hours.
CSE 8813 Theory of Computation: 3 hours.
CSE 8833 Algorithms: 3 hours.
CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8303 Advanced Immunology: 3 hours.
CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
CVM 8503 Epidemiology/Biostatistics: 3 hours.
CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
CVM 8993 Functional Genomics: 3 hours.
ST 6243 Data Analysis I: 3 hours.
ST 6253 Data Analysis II: 3 hours.
ST 8214 Design and Analysis of Experiments: 4 hours.

Course Descriptions (required and elective courses)

BCH 6414 Protein Methods: 4 hours.
(Prerequisite: Coregistration in BCH 4603/6603). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of protein biochemistry

BCH 6713 Molecular Biology: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of basic molecular process such as synthesis of DNA, RNA, and protein in both prokaryotic and eukaryotic cells. Offered fall semester. (Same as GNS 6713)

BCH 6804 Molecular Biology Methods: 4 hours.
(Prerequisite:Coregistration in BCH 4613/6613). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of molecular biology. (Same as GNS 4804/6804),

BCH 6990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BCH 8243 Molecular Biology of Plants: 3 hours.
(Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of plant development at the molecular level. Emphasis will be placed on the influence of nucleic acid metabolism on plant development

BCH 8633 Enzymes: 3 hours.
(Prerequisites: BCH 4613/6613). Three hours lecture. A study of enzymes; their purification, classification, kinetics and mechanisms

BCH 8643 Molecular Genetics: 3 hours.
(Prerequisites: PO 3103, or BIO 3103, and Coregistration in BCH 5613/7613). Three hours lecture. Study of the gene and its expression with emphasis on structure and function in higher organisms. (Same as GNS 8643)

BCH 8653 Genomes and Genomics: 3 hours.
(Prerequisites:BCH 4113/6113 or BCH 4713/6713 or BCH 8643 or consent of instructor). Overview of genome structure and evolution with emphasis on genomics, the use of molecular biology, robotics, and advanced computational methods to efficiently study genomes. (Same as PSS 8653)

BCH 8990 Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

BIO 6133 Human Genetics: 3 hours.
(Prerequisite: BIO 1134 and BIO 1144 or BIO 2113 or consent of instructor)Three hours lecture Principles of Mendelian and molecular genetics as applied to humans. Description and causes of human genetic diseases and other anomalies. (Same as GNS 4133/6133)

BIO 6113 Evolution: 3 hours.
(Prerequisites: MA 1313 or equivalent, BIO 1134 and BIO 1144, BIO 3103 or BIO 4133). Historical development of evolutionary theory; phylogeny and systematic; historic or organic evolution; molecular and phenotypic variation in populations; genetic drift and natural selection; speciation

BIO 6143 Population Genetics: 3 hours.
(Prerequisite: Both BIO 1134 and 1144, or BIO 2113, or consent of instructor. Three hours lecture. Study of the structure of genetic variation in populations and its applications in life sciences

BIO 6443 Bacterial Genetics: 3 hours.
(Prerequisites: BCH 4603, BIO 3304 or consent of instructor). Three hours lecture. The genetics of bacteria and their viruses including: replication, rearrangement, repair, transfer, regulation, and methods of manipulation and analysis of DNA

BIO 6990 Special Topics in Biological Sciences: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CMB 8011 Graduate Seminar: 1 hour.
This course serves as an introduction to the graduate program in computational biology and will introduce students to common methods and current research in bioinformatics and computational biology.

CMB 8013 Applied Computational Biology: 3 hours.
This course focuses on the application of computational methods and tools to explore biological processes and diversity.

CSE 6163 Designing Parallel Algorithms: 3 hours.
(Prerequisites: Grade of C or better in CSE 3324 or CSE 4733/6733). Three hours lecture. Techniques for designing algorithms to take advantage efficiently of different parallel architectures. Includes techniques for parallelizing sequential algorithms and techniques for matching algorithms to architectures

CSE 6214 Introduction to Software Engineering: 4 hours.
(Prerequisite: CSE 2383 with a grade of C or better). Three hours lecture. Two hours laboratory. Introduction to software engineering; planning, requirements, analysis and specification, design; testing; debugging; maintenance; documentation. Alternative design methods, software metrics, software projecet management, reuse, and reengineering

CSE 6503 Database Management Systems: 3 hours.
(Prerequisites: CSE 2383 and CSE 2813, both with a grade of C or better). Three hours lecture. Modern database models; basic database management concepts; query languages; database

design through normalization; advanced database models; extensive development experience in a team environment

CSE 6623 Computational Biology: 3 hours.
(Prerequisite:BCH 4113/6113 or equivalent and CSE 1384 or CSE 4613/6613). Three hours lecture. Computational analysis of gene sequences and protein structures on a large scale. Algorithms for sequence alignment, structural and functional genomics, comparative genomics, and current topics

CSE 6633 Artificial Intelligence: 3 hours.
(Prerequisite:Grade of C or better in CSE 2383 and CSE 2813) Three hours lecture. Study of the computer in context with human thought processes. Heuristic programming;search programming; search strategies; knowledge representation; natural language understanding; perception; learning

CSE 6753 Foundations in Computation: 3 hours.
(Prerequisite: CSE 1213 or CSE 1233 or CSE 1273 or CSE 1284 with a grade of C or better, or permission of instructor). Three hours lecture. Foundational concepts of computational algorithm design and analysis. (No credit for student in Computer Science, Computer Engineering, or Software Engineering degree programs)

CSE 6833 Introduction to Analysis of Algorithms: 3 hours.
(Prerequisites:CSE 2383,CSE 2813, and MA 2733 with a grade of C or better). Three hours lecture. Study of complexity of algorithms and algorithm design. Tools for analyzing efficiency; design of algorithms, including recurrence, divide-and-conquer, dynamic programming and greedy algorithms

CSE 6990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CSE 8163 Parallel and Distributed Scientific Computing: 3 hours.
(Prerequisite:CSE 4163/6163). Three hours lecture. Algorithms for distributed scientific computing; performance evaluation; scheduling and load balancing issues for scientific applications; architectural issues affecting performance

CSE 8413 Visualization: 3 hours.
(Prerequisites:CSE 4413/6413).Three hours lecture. Essential algorithms for three-dimensional rendering and modeling techniques;viewing transformations, illumination, surface modeling; methodologies for visualization of scalar and vector fields in three dimensions

CSE 8673 Machine Learning: 3 hours.
(Prerequisite: CSE 4633/6633). Three hours lecture. Introduction to machine learning, including computational learning theory, major approaches to machine learning, evaluation of models, and current research

CSE 8813 Theory of Computation: 3 hours.
(Prerequisite: CSE 3813).Three hours lecture.Study of abstract models of computation,unsolvability,complexity theory, formal grammars and parsing, and other advanced topics in theoretical computer science

CSE 8833 Algorithms: 3 hours.
(Prerequisites: CSE 4833/6833).Three hours lecture. Advanced techniques for designing and analyzing algorithms, advanced data structures, case studies, NP-completeness including reductions, approximation algorithms

CSE 8843 Complexity of Sequential and Parallel Algorithms: 3 hours.
(Prerequisite:CSE 4833/6833).Three hours lecture. Complexity of sequential algorithms, theory of complexity, parallel algorithms

CSE 8990 Special Topics in Computer Science and Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 6990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8303 Advanced Immunology: 3 hours.
(Prerequisite: BIO 6413 or equivalent or consent from the instructor). Three hours lecture. Advanced theory and concepts of immunology, structure and function of immune mechanisms are discussed in detail

CVM 8403 Principles of Pharmacology and Pharmacokinetics: 3 hours.
Three hours lecture. This course addresses basic principles of how the body reacts to the presence of a drug or toxin and the mathematical expression of drug residues

CVM 8503 Epidemiology/Biostatistics: 3 hours.
(Prerequisite: ST 8114) Three hours lecture. Fundamental principles of descriptive and analytical epidemiology

CVM 8990 Special Topics in Veterinary Medicine: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

CVM 8993 Functional Genomics: 3 hours.
(Prerequisites: BCH 6713 Molecular Biology and ST 6243 Data analysis or consent of instructor). Three hours lecture. Fundamental concepts, technology, and applications of

functional genomics, such as microarray, yeast hybrid systems, and RNA inference, emphasizing experimental design, analysis, and applications in biomedical research

ST 6243 Data Analysis I: 3 hours.
(Prerequisite:MA 2743, Corequisite MA 3113). Three hours lecture. Data description and descriptive statistics, probability and probability descriptions, parametric one-sample and two-sample inference procedures, simple linear regression, one-way ANOVA. Use of SAS. (Same as MA 4243/6243)

ST 6253 Data Analysis II: 3 hours.
(Prerequisite:MA/ST 4243/6243 and MA 3113). Three hours lecture. Multiple linear regression fixed, mixed, and random effect models;block design;two-factor analysis of variance;three-factor analysis of variance; analysis of covariance. Use of SAS. (Same as MA 4253/6253)

ST 8114 Statistical Methods: 4 hours.
(Prerequisite: MA 1313). Three hours lecture. Two hours laboratory. Fall and Spring semesters. Descriptive statistics; sampling distributions; inferences for one and two populations; completely random, block, Latin square, split-plot designs; factorials; simple linear regression; chi-square tests

ST 8214 Design and Analysis of Experiments: 4 hours.
(Prerequisite: ST 8114) Three hours lecture. Three hours laboratory. Offered spring semester. Procedures in planning and analyzing experiments; simple, multiple, and curvilinear regression; factorial arrangement of treatments; confounding; fractional replication; block designs; lattices; split-plots

MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF ARTS & SCIENCES

March 26, 2019

To Whom It May Concern,

It is my pleasure to write this letter of support for the development of a computational biology interdisciplinary graduate program. A core group of faculty (Drs. Perkins, Counterman, Hoffman, and Nanduri) across four colleges (Engineering, Arts & Sciences, College of Agriculture & Life Sciences, and the Vet School) have worked together to create a wonderful proposal for graduate students at the masters and doctoral level interested in working in computational biology. The degree will be housed in the Provost's office with courses offered in the four colleges. Students will work with their major professor within the discipline itself (computer sciences, biological sciences, bio chemistry, or vet medicine) to work toward their degree plan.

Arts & Sciences is supportive of the development of this program. We look forward to working collaboratively with the Provost's Office, College of Engineering, College of Agriculture and Life Sciences, and the Vet School to assist with oversight and also to help market the program to our students. Please let us know if you need additional information.

Sincerely,

Nicole E. Rader

Nicole Rader
Associate Dean for Academic Affairs,
College of Arts & Sciences
Professor, Sociology
Mississippi State University

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

OFFICE OF THE DEAN OF ENGINEERING

Dr. Kari Babski-Reeves, CPE
Professor
kari@bagley.msstate.edu

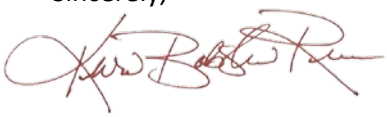
March 22, 2019

RE: Proposed Interdisciplinary Computational Biology Program

To Whom it May Concern,

I am pleased to write this letter of support for the development of a multidisciplinary graduate degree program in Computational Biology. For a number of years we have run a successful NSF REU program in this area under the direction of Andy Perkins. The popularity of this effort, as well as internal desire of students to engage in this area of endeavor illustrates a need for an educational opportunity. The Bagley College of Engineering is supportive of the development of this program housed in the Office of the Provost. The college will work with the other units involved to promote the program and provide oversight of those aspects that are under the purview of the college. If there are any additional questions or if I need to clarify anything that I've stated, please do not hesitate to let me know.

Sincerely,



Kari Babski-Reeves
Associate Dean for Research and Graduate Studies
IRB Chair

MISSISSIPPI STATE UNIVERSITY

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
Box 9760
Mississippi State, MS 39762
P. 662.325.2110
cals.msstate.edu

March 27, 2019

To Whom It May Concern:

The College of Agriculture & Life Sciences fully supports the development of a multidisciplinary graduate degree program in computational biology. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Emily E. Shaw
Director of Undergraduate & Graduate Academic Advising
College of Agriculture & Life Sciences

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 26, 2019

To Whom it May Concern,

The College of Veterinary Medicine fully supports the development of multidisciplinary graduate degree program in computational biology. We appreciate the effort and dedication required to create this curriculum and are confident in its success. We look forward to collaborating with the Provost's Office and participating colleges to oversee and promote the program.

Sincerely,

Ron McLaughlin
Associate Dean for Administration
Professor of Surgery
College of Veterinary Medicine

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 Agriculture and Life Sciences **Department:** School of Human Sciences
Contact Person: Juyoung Lee **Mail Stop:** 9745 **E-mail:** jl2197@msstate.edu
Nature of Change: Add New Certificate **Date Initiated:** 01/26/2019 **Effective Date:** 8/1/2019
Program will be offered at: Starkville (Campus 1)

Major: **Concentration:**

New Degree Program Name: Retail Certificate
Major: **Concentration:**

Summary of Proposed Changes:
A multi-disciplinary retail certificate program is proposed to provide current and future professionals in the field of retail. Students will need to complete 6 undergraduate courses – 18 credit hours to receive a Retail Certificate. This certificate and associated courses will be available to any degree-seeking undergraduate majors.

Approved:	**Date:**
Michael E. Newman Department Head	3-28-19
Chair, College or School Curriculum Committee	4-1-19
Dean of College or School	4/2/19
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council(if applicable)	
Chair, Deans Council	

PROPOSAL FOR ADDITION OF CERTIFICATE PROGRAM

1. CATALOG DESCRIPTION

The Retail Certificate offered by the Fashion Design and Merchandising (FDM) program will complement existing B.S. degree tracks by adding an opportunity to students from any program to complete a formal and coherent grouping of courses with a retail focus. The goal of the Retail Certificate is to introduce current students to the dynamics of the retail industry and to provide them knowledge and tools to be successful in a rapidly growing industry. Recipients of the certificate will be equipped with professional knowledge and technical skills to manage real world daily operations of a retail business and be ready for successful careers in the ever growing and changing retail industry. Requirements: Students will need to complete 6 undergraduate courses – 18 credit hours (Required: FDM 2553, FDM 2333, FDM 3553, FDM 4693, and choose two related electives to be approved by the retail certificate coordinator) to receive a Retail Certificate. The required FDM courses are offered throughout the academic year face to face (fall or spring) and online (summer).

2. CURRICULUM OUTLINE

NEW DEGREE OUTLINE FORM

PROPOSED New Certificate Description	
Certificate: Retail	
The Retail Certificate offered by the Fashion Design and Merchandising (FDM) program will complement existing B.S. degree tracks by adding an opportunity to students from any program to complete a formal and coherent grouping of courses with a retail focus. The goal of the Retail Certificate is to introduce current students to the dynamics of the retail industry and to provide them knowledge and tools to be successful in a rapidly growing industry. Recipients of the certificate will be equipped with professional knowledge and technical skills to manage real world daily operations of a retail business and be ready for successful careers in the ever growing and changing retail industry. Requirements: Students will need to complete 6 undergraduate courses – 18 credit hours (Required: FDM 2553, FDM 2333, FDM 3553, FDM 4693, and choose two related electives to be approved by the retail certificate coordinator) to receive a Retail Certificate. The required FDM courses are offered throughout the academic year face to face (fall or spring) and online (summer).	
Administration: The program of the Retail Certificate will be administered through the School of Human Sciences. A Fashion Design & Merchandising faculty member will be assigned as the Retail Certificate coordinator and will oversee the program's administration. The Retail Certificate coordinator will report on the progress of the program to the Director of the School of Human Sciences. Admission: The Retail Certificate is open to any undergraduate degree-seeking student in good standing enrolled at the university. Students may complete the certificate as Campus 1 or Campus 5 or a combination of the required courses.	
Proposed Curriculum Outline	**Required**

	Hours
Required Courses	
FDM 2553 Intro to Merchandising	3
FDM 2333 Intro to Retail Buying and Management	3
FDM 3553 Merchandise Pricing and Inventory Management	3
FDM 4693 Digital Merchandising	3
Electives	
Select two electives approved by the Retail Certificate coordinator in your area of specialization, i.e. Ag Leadership, Ag Science, Food Science, Animal Science. 3000 level or higher.	6
Total Hours	18

COURSE DESCRIPTIONS FOR THE CERTIFICATE

FDM 2553 Intro to Merchandising: Three hours lecture. A survey of the entire consumer goods industry as it relates to merchandising.

FDM 2333 Intro to Retail Buying and Management: (Prerequisites: FDM 2553). Three hours lecture. Concepts and theories in merchandise buying and management; roles and responsibilities of merchandise buyers; domestic and foreign merchandise resources and negotiation.

FDM 3553 Merchandise Pricing and Inventory Management: (Prerequisites: FDM 2553 and ST 2113 or MA 2113 or BQA 2113 or consent of instructor). Two hours lecture. Two hours laboratory. Specific problems, procedures and practices in merchandise pricing and inventory management.

FDM 4693 Digital Merchandising: Three hours lecture. A study of electronic merchandising and its application to consumer products and services for business to business and business to consumer. Introduction to electronic merchandising theory, terminology, resources, industry participants and career opportunities.

Electives: Students will select two courses related to their area of specialization and submit for approval by the Retail Certificate coordinator. Courses should focus on the technical processes specific to an industry and must be at the 3000 level or higher. Course approvals will be granted during the scheduled University advising period.

3. JUSTIFICATION FOR RETAIL CERTIFICATE

Currently the retail industry is the #1 employer of individuals in the state of MS and ranks third in total GDP output for the state following only manufacturing and real estate. There are over 35,000 retail establishments in the state and the growth projection for the next few years is 7-10%. Retail in MS makes a $17.8 billion impact on the state's economy and currently there are no retail specific certifications or certificates available. Our goal is to provide these aspiring professionals an opportunity to learn new skills and develop leadership/management training which will result in higher paying jobs and opportunities. Additionally, certificate recipients of the program will be able to build a competitive edge against graduates from programs in the other states with the similar certificate programs (Table 1).

Students enrolled in the program will have an opportunity to take the courses both online and face-to-face to complete the certificate. We are anticipating 150 currently enrolled FDM students to take advantage of the retail certificate within the first three years. This will not affect class enrollment sizes, as many of these students would have taken these courses as part of their current B.S. programs. We are also anticipating 30-50 undergraduate students in other programs within the first three years. This will be catered through offering more sections of the existing FDM classes.
Target Audience: The target audience for the certificate program would be current and future students enrolled in FDM and those programs where students are engaging in retail following graduation. For instance, many students in College of Agriculture and Life Sciences are employed with retail/sales operations post-graduation. The required course offerings will provide them with certifications from National Retail Federation to be used in their employment.

4. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

The certificate program will prepare students in the rapidly changing fashion and retail industry with new skill sets and the understanding of the nature of the industry and will enhance employment opportunities in this area. Following completion of the certificate coursework, students will be able to:

- Describe and understand retail and merchandising terminology in relation to operations, management, pricing inventory management, and digital retailing.
- Apply critical thinking skills in consumer interactions in a retail setting.
- Improve technical skills to use in daily retail operations by learning computer software used in the retail and fashion industry (e.g., Excel, Microsoft Access, etc.).
- Apply skills to analyze a retail business within the current environment.

5. **EFFECTIVE DATE:** Fall 2019

6. **PROPOSED 4-LETTER ABBREVIATION:** RETL

7. **CONTACT:**

Dr. Juyoung Lee, Assistant Professor
Fashion Design & Merchandising
School of Human Sciences
P.O. Box 9745
Mississippi State, MS 39762
662-312-2869
jl2197@msstate.edu

8. **LETTER OF SUPPORT**: Please see the attached letters of support from the School of Human Sciences' Curriculum Committee.

Table 1. List of Universities Offering Certificates Related to Retail

Name of University	Name of Certificate	Required Courses
University of Houston Downtown	Retail Management Certificate	Introduction to Retail Management Building Customer Relations Servicing the Customer Hiring and Evaluating Employees Understanding Performance Metrics Budgeting, Forecasting, and Trends Merchandising Risk Management Suppliers and Distribution Centers Employment Laws Leadership Ethics and Social Responsibility
Florida International University	Certificate in Retail Marketing and Management	MAR 3023 Intro to Marketing MAR 4231 Retail Marketing MAR 4232 Current Issues in Retailing MAR 4674 Marketing Analytics Choose two of the electives MAR 4503 Consumer Behavior MAR 4643 Decision Makin and Negotiations MAR 4850 Customer Relationship Management
University of Houston	Certificates in Retailing and Consumer Science	**Apparel Merchandising** HDCS 3303 Merchandising and Consumer Science HDCS 3304 Visual Merchandising HDCS 4302 Apparel Analysis HDCS 4303 Merchandising Systems HDCS 4380 Merchandising **Retail Organizations** HDCS 3300 Organization Decisions in Technology HDCS 3301 Consumer Science HDCS 3303 Merchandising and Consumer Science HDCS 4303 Merchandising Systems HDCS 4380 Merchandising
Texas A&M University	Certificate in Retailing	MKTG 325 Retail Concepts and Policies MKTG 326 Strategic Retailing MKTG 425 Retail Merchandising MKTG 426 Advanced Retail Case Study MKTG 438 Strategic Digital Marketing An approved internship Participation in the Student Retailing association for two semesters
State University of New York (FIT)	Retail Management Certificate	MG 153 Excel for Business FM 327 Case Studies in Fashion Merchandising FM 361 Leadership Development for Retailing FM 362 Dynamics of Store Operations Management FM 462 Retail Management Strategies
University of Wisconsin Parkside	Retail Management Certificate	RMGT 453 Retail Management RMGT 454 Services Management MKT 355 Buyer Behavior MIS 429 e-Business

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

Institution:		
Date of Implementation: **8/1/2019**	Six-Digit CIP Code (& Four-Digit Sequence Code if modification/deletion): **521904**	Total Credit Hours: **18**
CIP & Sequence codes: IHL Active Program Inventory		
Program Title as will Appear on Academic Program Inventory: Retail Certificate		☒ Offer ☐ Modify ☐ Delete
Responsible Academic Unit(s): Fashion Design and Merchandising, School of Human Sciences	Institutional Contact: Juyoung Lee Phone: 662-312-2869 Email: jl2197@msstate.edu	
Vocational Certificate: O **Yes** ☐ **No**	Credit Bearing Program: O **Yes** ☐ **No**	Title IV Financial Aid Eligible: O **Yes** ☐ **No**

Which of the following best describes the certificate program:

O	**Pre-Baccalaureate (Less than 1 Year)**	**Undergraduate program with duration less than one academic year; designed for completion in less than 30 credit hours**
	Pre-Baccalaureate (At Least 1 Year)	**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**
	Post-Baccalaureate	**Program designed beyond the baccalaureate degree but does not meet the requirements for a master's degree**
	Post-Master's	**Program designed beyond the master's degree but does not meet the requirements for a doctoral degree**
	Other	**Other certificate program not meeting one of the four criteria above.**

Program Summary: **A multi-disciplinary retail certificate program is proposed to provide current and future professionals in the field of retail. Students will need to complete 6 undergraduate courses – 18 credit hours to receive a Retail Certificate. This certificate and associated courses will be available to Fashion Design and Merchandising (FDM) major and other majors in the area of specialization for each individual student approved by the Retail Certificate coordinator.**

_____ _____
Institutional Contact Signature Date

_____ _____
Chief Academic Officer Signature Date

MISSISSIPPI STATE UNIVERSITY

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

February 27, 2019

Dr. Franz,

On behalf of faculty representing the Agricultural Science and Agricultural Education, Leadership, and Communications (AELC) degrees in the School of Human Sciences I am pleased to submit this letter of support for the Retail Certificate proposed by the Fashion Design and Merchandising (FDM) program. The proposed certificate will provide a value-added opportunity for students primarily in the Agricultural Science degree, as well as the Leadership and Communications concentrations of the AELC degree. This unique set of proposed courses offers our students an opportunity to develop pertinent knowledge and skills in agribusiness that compliments the current required coursework of our degrees.

Please accept this letter of support for the proposed Retail Certificate offered by Fashion Design and Merchandising. If you have any questions or concerns, I am happy to address them.

Agricultural Science and AELC faculty represented include:

Laura L Greenhaw
Carla Jagger
Carley Morrison
Kirk Swortzel

Respectfully,

Laura L. Greenhaw
Assistant Professor
AELC-Leadership concentration

MISSISSIPPI STATE UNIVERSITY

Department of Food Science, Nutrition, and Health Promotion

February 28th, 2019

To: University Courses and Curriculum Committee

From: M. Wes Schilling
Food Science, Nutrition, and Health Promotion;
Curriculum Committee Chair

Subject: Retail Certificate Program

Subject:

Faculty members in the Department of Food Science, Nutrition, and Health Promotion have reviewed the Retail Certificate Program that is being proposed by the School of Human Sciences. Faculty have indicated that this may potentially be of interest to Food Science and Culinology Students.

The proposed support of a retail certificate program has been voted on and approved by Food Science, Nutrition and Health Promotion Teaching Faculty by a vote of 6 yes votes and 1 no votes.

Wes Schilling

M. Wes Schilling
FNH Curriculum Committee Chair

BOX 9805•MISSISSIPPI STATE, MS 39762-9805•PHONE 662.325.4002•www.mstate.edu/dept/fsnhp

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF
ANIMAL AND DAIRY SCIENCES
P.O. Box 9815
Mississippi State, MS 39762
P. 662.325.2802
F. 662.325.8873

February 25, 2019

Dr. Franz,

The Undergraduate Curriculum Committee in the Department of Animal and Dairy Sciences (ADS) unanimously supports the proposed Retail Certificate by the Fashion Design & Merchandising (FDM) program. The proposed certificate will most likely serve students primarily in the Business & Industry concentration within the ADS program as it aligns well with the required coursework, however, any student in the ADS program will have the option to complete this certificate program. This is a unique set of coursework that will provide our students with knowledge and skills not traditionally earned through ADS coursework.

Please accept this letter of support for the proposed Retail Certificate offer by Fashion Design and Merchandising. If you have any questions or concerns, I will be happy to address them.

Undergraduate Curriculum Committee Members include:

Jessica M. Graves (Chair)
Clay Cavinder
Brett Crow
Derris Devost-Burnett
Thu Dinh
Jamie E. Larson
Caleb O. Lemley
Shengfa Liao
Erdogan Memili
Molly Nicodemus
Henry Paz
Brian J. Rude
Trent Smith
Amanda Stone

Animal and Dairy Sciences
Undergraduate Coordinator & Instructor
Office: 662-325-2936

MISSISSIPPI STATE UNIVERSITY

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

March 5, 2019

Ms. Jessica Graves
Chair, CALS Curriculum Committee
Box 9815
Mississippi State, MS 39762

Ms. Graves:

The School of Human Sciences Curriculum Committee has reviewed the new degree proposal for a multidisciplinary Retail Certificate, and we support its approval. The proposal demonstrates the need for this type of training as well as the availability of staff, library support, and other necessary resources. We believe the proposed certificate program will benefit students from multiple departments, across campus, to be more competitive in the industry.

Sincerely,

Joe D. Wilmoth, Chair

Alisha Hardman, Member

Julie Parker, Member

JuYoung Lee, Member

Brandan Wheeler, Member

Carley Morrison, 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 Business

Department: Department of Marketing, Quantitative Analysis & Business Law

Contact Person: Melissa Moore **Mail Stop:** 9582 **E-mail:** MLM145@msstate.edu

Nature of Change: Modify Modify Degree Core Modify Degree Electives Addition of Concentration	**Date Initiated:** FEB 2019	**Effective Date:** Upon Approval

Current Degree Program Name: Bachelor of Business Administration
Major: Marketing **Concentration**: Supply Chain Management
Professional Golf Management

New Degree Program Name: Bachelor of Business Administration
Major:Marketing **Concentration**: Supply Chain Management
Professional Golf Management
Integrated Digital Marketing

Summary of Proposed Changes:

1) Based on UCCC approved College Core Changes (2/2019), modify the Marketing degree to:
Remove FIN 3113 from BBA core
Add MKT 3323 to BBA core
Modify MGT 3114 to MGT 3113
Reduce number of hours for the degree by 1 to 123 hours.
Remove MKT 3323 as a Marketing Major Elective.

2) Based on UCCC approved course addition (3/2019) of MKT 4223 Social Media Marketing:
Add this course as an elective for Marketing majors and PGM majors.

3) Addition of new concentration, the Integrated Digital Marketing Concentration utilizing existing courses.

Approved: Date:

Department Head 3-4-19

Chair, College or School Curriculum Committee 3/20/19

Dean of College or School 4/2/19

Chair, University Committee on Courses and Curricula

Chair, Graduate Council(if applicable)

Chair, Deans Council

CURRENT Degree Description

This department offers one major (Marketing), two minors (Marketing and Business Analytics), and two concentrations (PGA Golf Management and Supply Chain Management). In addition, the department offers marketing, quantitative analysis and business law courses to support other programs in the college and across campus.

Marketing Major (MKT)

Marketing consists of three significant interlocking activities:

1. understanding consumers along with their wants and unfilled needs;
2. developing improved products and services that meet the identified needs of consumers; and
3. communicating the benefits of the improved products and services through advertising, public relations, promotion and effective salesmanship.

Courses offered within this unit prepare students to provide marketing leadership and assume a variety of career paths, including field sales, brand management, marketing communications, store management, procurement, logistics, and small business.

PGA Golf Management Concentration (PGM)

Director: Jeffrey W. Adkerson, PGA
Office: 309 McCool Hall; Phone: (662) 325-3161
The PGA Golf Management Program is the second oldest PGA Golf Management Program program accredited by the Professional Golfers' Association of America (PGA). The Program prepares graduates for careers as Class A PGA Professionals at golf courses and other industry businesses. A PGA Professional must have a broad assortment of marketing, management and other business-related skills to be effective in the golf profession today. The PGA Golf Management Program is a demanding four and one half year curriculum.

The 4 ½ year program leads to a bachelor's degree in business administration with a major in marketing. In addition to the requirements for a degree in marketing, students must complete courses in turf management, food management, landscape architecture, human resource management; and all PGA Golf Management requirements. Students must also complete a minimum of 16 months of co-op under the guidance of the MSU Cooperative Education Program. These work experiences are under the tutelage of Class A PGA Professionals throughout the country. Students are required to be continuously enrolled at MSU as full-time

PROPOSED Degree Description

This department offers one major (Marketing), two minors (Marketing and Business Analytics), and **three** concentrations (PGA Golf Management, Supply Chain Management and **Integrated Digital Marketing**). In addition, the department offers marketing, quantitative analysis and business law courses to support other programs in the college and across campus.

Marketing Major (MKT)

Marketing consists of three significant interlocking activities:

1. understanding consumers along with their wants and unfilled needs;
2. developing improved products and services that meet the identified needs of consumers; and
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students or in the MSU Cooperative Education Program according to their co-op schedule. Those who complete the program thus earn a prestigious degree, and upon eligible employment, membership in the PGA of America.

PGA Membership. Please see PGA Golf Management staff to discuss PGA Membership Requirements.
PGA Golf Management Graduation Requirements. Students must complete the last semester in school (not on co-op). They must also pass the PGA Playing Ability Test, complete 16 months of co-op, and complete all levels of the PGA Golf Management Program.
PGA Golf Management Admission Procedures. The PGA Golf Management Program has a limited enrollment. The current enrollment limit is 200; however, this number is subject to change based on the placement outlook and PGA Golf Management and Co-op budget constraints. The number of students admitted each year is determined by graduation and attrition of the previous year. Students are admitted once per year for entrance in the fall semester. The deadline for completed applications is May 1 each year.
Entrance Requirements

Freshmen:

- Meet MSU regular admission requirements
- Have a USGA Handicap of 8 or less

Transfer Students:

- Meet MSU admission requirements
- 2.5 GPA with maximum of 62 applied semester hours
- Have a USGA Handicap of 8 or less

Non-Citizen:

- The MSU PGA Golf Management Program is sanctioned by PGA of America to educate and train graduates to become PGA Members. International students must complete and sign a non-citizen form as required by the PGA of America.

Supply Chain Management Concentration (SCM)

Supply chain management continues to play a major role in the national and international economy. As businesses continue to focus on logistics and transportation improvements, job opportunities for graduates in the supply chain management concentration increase. The curriculum in the supply chain management concentration will acquaint the student with the issues, perspectives, and techniques associated with transportation and logistics theory and practice. It offers in-depth treatment of distribution, supply, warehousing, inventory control, and operations in the modes of transportation.

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	Integrated Digital Marketing Concentration (IDM) **The internet and digital marketing have grown to become an important resource for organizations and consumers. As firms and individuals continue to focus on utilizing digital tools and applications for all aspects of marketing from product development, consumer behavior and customer touch points, job opportunities for graduates in the integrated digital marketing concentration increase. The curriculum in the integrated digital marketing concentration will provide the student with the strategic application skills needed in the digital world. Students will be exposed to industry standard tools and techniques through the analyses and assessment of leading firm practices and the development of comprehensive applied projects.**
Degree: Bachelor of Business Administration Major: Marketing Concentration: Supply Chain Management (SCM) Professional Golf Management (PGM)	Degree: Bachelor of Business Administration Major: Marketing Concentration: Supply Chain Management (SCM) Professional Golf Management (PGM) **Integrated Digital Marketing (IDM)**
CURRENT CURRICULUM OUTLINE	CURRENT CURRICULUM OUTLINE

English Composition

EN 1103	English Composition I	3
or EN 1163	Accelerated Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

Mathematics

MA 1313	College Algebra	3
MA 1613	Calculus for Business and Life Sciences I	3
BQA 2113	Business Statistical Methods I	3

Science

2 Lab Sciences from General Education courses	6

English Composition

EN 1103	English Composition I	3
or EN 1163	Accelerated Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

Mathematics

MA 1313	College Algebra	3
MA 1613	Calculus for Business and Life Sciences I	3
BQA 2113	Business Statistical Methods I	3

Science

2 Lab Sciences from General Education courses	6

Humanities		
See General Education courses		6
Fine Arts		
See General Education courses		3
Social Sciences		
PS 1113	American Government	3
Introductory course in AN, PSY or SO		3
College Core		
BQA 3123	Business Statistical Methods II	3
ACC 2013	Principles of Financial Accounting	3
ACC 2023	Principles of Managerial Accounting	3
EC 2113	Principles of Macroeconomics	3
EC 2123	Principles of Microeconomics	3
BL 2413	The Legal Environment of Business	3
BIS 3233	Management Information Systems	3
FIN 3113	*Financial Systems*	*3*
FIN 3123	Financial Management	3
MKT 3013	Principles of Marketing	3
MGT 3114	*Principles of Management and Production*	*4*
BUS 4853	Business Policy	3
Oral Communication Requirement		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

Humanities		
See General Education courses		6
Fine Arts		
See General Education courses		3
Social Sciences		
PS 1113	American Government	3
Introductory course in AN, PSY or SO		3
College Core		
BQA 3123	Business Statistical Methods II	3
ACC 2013	Principles of Financial Accounting	3
ACC 2023	Principles of Managerial Accounting	3
EC 2113	Principles of Macroeconomics	3
EC 2123	Principles of Microeconomics	3
BL 2413	The Legal Environment of Business	3
BIS 3233	Management Information Systems	3
FIN 3123	Financial Management	3
MKT 3013	Principles of Marketing	3
MKT 3323	**International Logistics**	**3**
MGT 3113	**Principles of Management and Production**	**3**
BUS 4853	Business Policy	3
Oral Communication Requirement		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

Computer Literacy Requirement		
BIS 1012	Introduction to Business Information Systems	2
Writing Requirement		
MGT 3213	Organizational Communications	3
Major Core		
International Elective (see advisor for options)		3
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MKT 4813	Marketing Management	3
Choose four of the following:		12
MKT 3213	Retailing	
MKT 4113	Personal Selling	
MKT 4123	Advertising	
MKT 4213	Internet Marketing	
MKT 4423	Strategic Brand Management	
MKT 4613	Services Marketing	
MKT 4143	Sales Management	
MKT 3933	International Marketing	
MKT 3323	*International Logistics*	
MKT 4033	International Transportation	
MKT 4313	Physical Distribution Management	
MKT 4333	International Supply Chain Management	
Non-business electives (see advisor for options) [1]		13
Free electives (see advisor for options) [1]		6
Total Hours		*124*

Computer Literacy Requirement		
BIS 1012	Introduction to Business Information Systems	2
Writing Requirement		
MGT 3213	Organizational Communications	3
Major Core		
International Elective (see advisor for options)		3
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MKT 4813	Marketing Management	3
Choose four of the following:		12
MKT 3213	Retailing	
MKT 4113	Personal Selling	
MKT 4123	Advertising	
MKT 4213 **MKT 4223**	Internet Marketing **Social Media Marketing**	
MKT 4423	Strategic Brand Management	
MKT 4613	Services Marketing	
MKT 4143	Sales Management	
MKT 3933	International Marketing	
MKT 4033	International Transportation	
MKT 4313	Physical Distribution Management	
MKT 4333	International Supply Chain Management	
Non-business electives (see advisor for options) [1]		13
Free electives (see advisor for options) [1]		6
Total Hours		**123**

[1] To be selected with the advice and approval of advisor

PGA Golf Management Concentration (PGM)

Director: Jeffrey W. Adkerson, PGA
Office: 309 McCool Hall; Phone: (662) 325-3161
Concentration Course Requirements

PGA Golf Management students are required to take all courses listed under the General Education and College requirements for Marketing in addition to the following courses:

MKT 2211	PGM Level I Seminar	1
MKT 2213	PGA Golf Facility Management I	3
MKT 2223	Introduction to Golf Swing Instruction	3
MKT 2233	Intermediate Golf Instruction	3
MKT 2243	PGA Golf Facility Management II	3
MKT 2252	Advanced Golf Instruction	2
MKT 3213	Retailing	3
MKT 4234	Golf Operations Management	4
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MGT 3513	Introduction to Human Resource Management	3
International Elective (see advisor for options)		3
Choose three of the following:		9
MKT 3933	International Marketing	
MKT 4113	Personal Selling	
MKT 4123	Advertising	
MKT 4143	Sales Management	
MKT 4213	Internet Marketing	
MKT 4423	Strategic Brand Management	
MKT 4613	Services Marketing	
Total Hours		*124*

Co-op Work

[1] To be selected with the advice and approval of advisor

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MKT 2213	PGA Golf Facility Management I	3
MKT 2223	Introduction to Golf Swing Instruction	3
MKT 2233	Intermediate Golf Instruction	3
MKT 2243	PGA Golf Facility Management II	3
MKT 2252	Advanced Golf Instruction	2
MKT 3213	Retailing	3
MKT 4234	Golf Operations Management	4
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MGT 3513	Introduction to Human Resource Management	3
International Elective (see advisor for options)		3
Choose three of the following:		9
MKT 3933	International Marketing	
MKT 4113	Personal Selling	
MKT 4123	Advertising	
MKT 4143	Sales Management	
MKT 4213 **MKT 4223**	Internet Marketing **Social Media Marketing**	
MKT 4423	Strategic Brand Management	
MKT 4613	Services Marketing	
Total Hours		**123**

Co-op Work

PGA Golf Management students must complete a minimum of 16 months of co-op work with Class A PGA professionals at country clubs, public golf courses, golf resorts, or other golf facilities. A 2.25 cumulative GPA on all work at MSU is required to earn credit for a specific work experience.

PGA Golf Management

PGA Golf Management students will complete all PGA Golf Management requirements including testing, which will be conducted on the Mississippi State University campus by officials of the PGA. An initial lab fee and a semester lab fee is charged to students each semester on campus to cover the PGA Golf Management seminars, tests, workshops and playing privileges at the MSU Golf Course. A typical schedule of classes and co-ops are as follows:

Freshman Year	
Fall School	16
Spring School	16
Summer Co-op	
Sophomore Year	
Fall School	16
Spring School	16
Summer Co-op	
Junior Year	
Fall Co-op	
Spring School	16
Summer School	12
Senior Year	
Fall School	16
Spring Co-op	
Summer Co-op	
Fall School (Graduation)	16

Supply Chain Management Concentration (SCM)

Concentration Course Requirements

Supply Chain Management students are required to take all courses listed under the General Education and College requirements for Marketing in addition to the following courses:

International Elective (see advisor for options)	3

PGA Golf Management students must complete a minimum of 16 months of co-op work with Class A PGA professionals at country clubs, public golf courses, golf resorts, or other golf facilities. A 2.25 cumulative GPA on all work at MSU is required to earn credit for a specific work experience.

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Freshman Year	
Fall School	16
Spring School	16
Summer Co-op	
Sophomore Year	
Fall School	16
Spring School	16
Summer Co-op	
Junior Year	
Fall Co-op	
Spring School	16
Summer School	12
Senior Year	
Fall School	16
Spring Co-op	
Summer Co-op	
Fall School (Graduation)	16

Supply Chain Management Concentration (SCM)

Concentration Course Requirements

Supply Chain Management students are required to take all courses listed under the General Education and College requirements for Marketing in addition to the following courses:

International Elective (see advisor for options)	3

MKT 3323	International Logistics	3
MKT 4033	International Transportation	3
MKT 4313	Physical Distribution Management	3
MKT 4333	International Supply Chain Management	3
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MKT 4813	Marketing Management	3
Non-business electives (see advisor for options)		13
Free electives		6
Total Hours		*124*

MKT 3323	International Logistics	3
MKT 4033	International Transportation	3
MKT 4313	Physical Distribution Management	3
MKT 4333	International Supply Chain Management	3
MKT 4413	Consumer Behavior	3
MKT 4533	Marketing Research	3
MKT 4813	Marketing Management	3
Non-business electives (see advisor for options)		13
Free electives		6
Total Hours		**123**

Integrated Digital Marketing Concentration (IDM)

Concentration Course Requirements
IDM students are required to take all courses listed under the General Education and College requirements for Marketing in addition to the following courses:

MKT 4213	**Internet Marketing**	**3**
MKT 4223	**Social Media Marketing**	**3**
Choose two of the following:		**6**
MKT 4123	**Advertising**	
MKT 4423	**Strategic Brand Management**	
MKT 3513	**Marketing Internship** (with prior approval)	
MKT 3213	**Retailing**	
Total Hours		**123**

3. JUSTIFICATION AND STUDENT LEARNING OUTCOMES:

A. Degree Modification Justification.

College Core Change.

The College degree requirements modifications were approved by UCCC in Feb 2019. These changes were to:
Remove FIN 3113 from BBA core
Add MKT 3323 to BBA core
Modify MGT 3114 to MGT 3113
Reduce number of hours for the degree by 1 to 123 hours.
The changes in the Marketing Degree reflect these changes, including removing MKT 3323 as a Marketing Major Elective.

Couse Addition.

Add MKT 4223 Social Media Marketing to the Marketing curriculum, it is listed as an available elective for the Marketing major and the PGM concentration.

LEARNING OBJECTIVES

- **Critical Thinking**: Students will be able to analyze and integrate information to solve problems and make business decisions.
- **Information Technology**: Students will demonstrate proficiency in the in the use of information technology tools and concepts vital to productivity
- **Communication**: Students will demonstrate proficiency in written and spoken communication skills.
- **Ethics**: Students will demonstrate an understanding of the legal and ethical ramifications of business decisions.
- **Teamwork**: Students will exhibit an understanding of interpersonal an team dynamics.
- **Diversity**: Students will understand the impact of a demographically and culturally diverse business environment.

B. Addition of Concentration Justification.

The addition of a concentration in Integrated Digital Marketing will provide Marketing Majors with an option to illustrate that they have substantive knowledge in the development and implementation of digital/internet based tools and have a solid foundation in marketing strategy. As firms have begun posting positions such as *SEO/SEM Manager, Internet Marketing Manager, Web Marketing Content Manager, Social Media Marketing Specialist, and Digital Marketing Specialist* having a designated concentration which identifies the skills students have obtained may assist them in more easily discussing their educational background and make them more attractive applicants in the workforce.

LEARNING OBJECTIVES

In addition to the aforementioned learning objectives, upon completion of the Integrated Digital Marketing Concentration, students will be able to:

- Develop an organizations digital strategy to include advertising & branding, website development, story telling, story boarding and social media strategy.
- Critically evaluate existing digital strategies of an organization.
- Pursue a career digital marketing.

Additional questions:

1. Will this program change meet local, state, regional, and national educational and cultural needs?

Core Degree Modification: Yes, the addition of MKT 3323 makes the college core more in line w/ peer institutions.
Course Addition: Yes, with the growth and widespread use of social media by firms, students need a foundational understanding of online communication principles.
IDM Concentration: Yes. As more firms utilize digital technology they will be looking for graduates that have the necessary skills and knowledge to fill those positions.

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

Core Degree Modification: No
Course Addition: No
IDM Concentration: No.

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

Core Degree Modification: The revised curriculum will make the overall program more competitive to prospective students. This should increase the program's ability to recruit a diverse population of students.
Course Addition: MKT 4223 may appeal to students outside of the college thus contributing to the diversity of the class.
IDM Concentration: The Marketing major is a diverse program. The visibility of the concentration may aid in the ability to recruit a diverse population.

4. Will this program change result in an increase in the potential placement of graduates in MS, the Southeast, and the U.S.?
Core Degree Modification: The addition of MKT 3323 will provide students with a critical diverse skill set. Our graduates need this exposure to be competitive in their career endeavors.
Course Addition: The class may motivate individuals to pursue a career in technology based communications which is a growing area and may result in higher placement rates.
IDM Concentration: The concentration may allow MSU graduates to more easily differentiate themselves and their skill set, thus a potential advantage in their career choices.

5. Will this program change result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S.?
Core Degree Modification: With the additional supply chain skills gained, this may increase salaries.
Course Addition: With the additional technology skills gained, this may increase salaries.
IDM Concentration: It is possible that students may more readily communicate their skill sets and potentially negotiate higher salaries.

4. SUPPORT Letters of support are included with the proposal.

5. PROPOSED 4-LETTER ABBREVIATION

N/A

6. EFFECTIVE DATE: Upon Approval.

MEMO:

College of Business
Dr. Marler
Chair, College Committee on Courses & Curriculum
McCool Hall

MISSISSIPPI STATE UNIVERSITY
MARKETING, QUANTITATIVE ANALYSIS AND BUSINESS LAW

From: Robert Moore, Chair, Department Curriculum Committee

Date: March 1, 2019
Re: Letter of Support for Marketing Degree Changes
1) Based on UCCC approved College of Core Changes (2/2019), modify the Marketing degree
Remove FIN 3113 from BBA core
Add MKT 3323 to BBA core
Modify MGT 3114 to MGT 3113
Reduce number of hours for the degree by 1 to 123 hours.
Remove MKT 3323 as a Marketing Major Elective.

Faculty	Support	Do Not Support	Signature	Date
Dr. Frank Adams fadams@business.msstate.edu	☑	☐		3/1/19
Dr. Mike Breazeale mbreazeale@business.msstate.edu	☑	☐		3/1/19
Dr. Joel Collier jcollier@business.msstate.edu	☑	☐		3-1-19
Dr. Adam Farmer afarmer@business.msstate.edu	☑	☐		3-4-19
Dr. Carol Jones cesmark@business.msstate.edu	☐	☐	ATTACHED	
Dr. Jason Lueg jlueg@business.msstate.edu	☑	☐		3/1/19
Dr. Robert Moore rmoore@business.msstate.edu	☑	☐		3/1/19
Dr. Melissa Moore mmoore@business.msstate.edu	☑	☐		3-1-19
Dr. Nicole Ponder nponder@business.msstate.edu	☐	☐	ATTACHED	
Dr. Kevin Shanahan kshanahan@business.msstate.edu	☑	☐		3/1/19

2) Based on UCCC approved course addition (3/2019) of MKT 4223 Social Media Marketing: Add this course as an elective for Marketing majors and PGM majors.

Faculty	Support	Do Not Support	Signature	Date
Dr. Frank Adams fadams@business.msstate.edu	☑	☐		3/6/19
Dr. Mike Breazeale mbreazeale@business.msstate.edu	☑	☐		3/1/19
Dr. Joel Collier jcollier@business.msstate.edu	☑	☐		3-1-19
Dr. Adam Farmer afarmer@business.msstate.edu	☑	☐		3-4-19
Dr. Carol Jones cesmark@business.msstate.edu	☐	☐	ATTACHED	
Dr. Jason Lueg jlueg@business.msstate.edu	☑	☐		3/1/19
Dr. Robert Moore rmoore@business.msstate.edu	☑	☐		3/1/19
Dr. Melissa Moore mmoore@business.msstate.edu	☑	☐		3-1-19
Dr. Nicole Ponder nponder@business.msstate.edu	☐	☐	ATTACHED	
Dr. Kevin Shanahan kshanahan@business.msstate.edu	☑	☐		3/1/19

3) Addition of new concentration, the Integrated Digital Marketing Concentration utilizing existing courses.

Faculty	Support	Do Not Support	Signature	Date
Dr. Frank Adams fadams@business.msstate.edu	☑	☐		3/6/19
Dr. Mike Breazeale mbreazeale@business.msstate.edu	☑	☐		3/1/19
Dr. Joel Collier jcollier@business.msstate.edu	☑	☐		3-1-19
Dr. Adam Farmer afarmer@business.msstate.edu	☑	☐		3-4-19
Dr. Carol Jones cesmark@business.msstate.edu	☐	☐	ATTACHED	
Dr. Jason Lueg jlueg@business.msstate.edu	☑	☐		3/1/19
Dr. Robert Moore rmoore@business.msstate.edu	☑	☐		3/1/19
Dr. Melissa Moore mmoore@business.msstate.edu	☑	☐		3-1-19
Dr. Nicole Ponder nponder@business.msstate.edu	☐	☐	ATTACHED	
Dr. Kevin Shanahan kshanahan@business.msstate.edu	☒	☐		3/1/19

Moore, Robert

From: Ponder, Nicole
Sent: Friday, March 1, 2019 3:35 PM
To: Moore, Robert
Subject: Re: Degree change for UCCC

Hi Rob,

I think I just missed your email - I had a 2:30 meeting off campus. Unfortunately, I won't be back in the office today and I am out of town Monday, Tuesday, and Wednesday of next week. I fully support all three proposals...could someone sign for me? I am totally okay with that. If not, Thursday would be the first chance I have to sign.

Happy weekend,
Nicole

Get Outlook for iOS

From: Moore, Robert <rmoore@business.msstate.edu>
Sent: Friday, March 1, 2019 2:09 PM
To: Ponder, Nicole
Subject: Degree change for UCCC

Hey Nicole,

I have the letter of support/non support for each of the 3 changes to the Marketing major degree in the copy room on the work desk for us all to sign.

If you prefer I can have an MBA student bring it down to you. If so, please let me know if there is a time you prefer today (Friday) or on Monday/Tuesday you would like them to bring it down.

Rob

Robert S. Moore, Ph.D.
Hunter Henry Fellow & Professor of Marketing
Department of Marketing, Quantitative Analysis & Business Law
324 H McCool
(662) 325-8648

Moore, Robert

From: Jones, Carol
Sent: Friday, March 1, 2019 7:31 PM
To: Moore, Robert
Subject: Re: Changes to the Marketing Degree

Hi Rob,

I'm going to again abstain from this. I'm not sure how involved I'm supposed to be in this stuff. I'm more than willing to but I don't want anyone to get upset, especially if a decision isn't unanimous.

Best,
Carol

From: Moore, Robert
Sent: Friday, March 1, 2019 2:11:15 PM
To: Collier, Joel; Farmer, Adam; Jones, Carol; Moore, Melissa
Subject: Changes to the Marketing Degree

Hi,

I have the letter of support/non support for each of the 3 changes to the Marketing major degree in the copy room on the work desk for us all to sign.

If you could, please select and sign today (Friday) or Monday/Tuesday and I will do the rest.

Rob

Robert S. Moore, Ph.D.
Hunter Henry Fellow & Professor of Marketing
Department of Marketing, Quantitative Analysis & Business Law
324 H McCool
(662) 325-8648

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, along with all required copies, to UCCC, Garner Hall, Room 279, Mail Stop 9702.

College: Education **Department:** ISWD

Contact Person: Dr. John Wyatt **Mail Stop:** 9730 **E-mail:** wyatt@colled.msstate.edu

Nature of Change: Modification **Date Initiated:** 02/11/2019 **Effective Date:** Spring 2020

Degree to be offered at: Campus 1

Current Degree Program Name: BS Industrial Technology

Major: Industrial Technology **Concentration:** Industrial Automation, Industrial Distribution, Manufacturing & Maintenance Management

New Degree Program Name:

Major: **Concentration:**

Summary of Proposed Changes: See attached sheet.

Approved:	*Date:*
Department Head	3-27-19
Chair, College or School Curriculum Committee	4-8-19
Dean of College or School	4-8-19
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council (if applicable)	
Chair, Deans Council	

☐ IHL Action Required

☐ SACS Letter Sent

A summary of the proposed changes for the Industrial Technology degree are as follows:

All TKI prefixes to be changed to INDT

Modification – name change - TKI 1203 Industrial Communication to INDT 1203 Industrial Drafting and Print Reading

Modification – name change - TKI 3343 CADCAM to INDT 3343 3D Modeling for Manufacture

Modification – course number change - TKI 4113 Industrial Fluid Power to INDT 2613 Industrial Fluid Power

Modification – name change – TKI 4343 CADCAM II to INDT 4343 Computer Aided Drafting and Design

Catalog Description (Old):
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design, and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics.

To this extent the curriculum is divided into three concentrations:
- Industrial Automation
- Industrial Distribution
- Manufacturing & Maintenance Management

These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree.

The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling.

Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.
NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.

Catalog Description (New):
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design, and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics.

To this extent the curriculum is divided into three concentrations:

- Industrial Automation
- Industrial Distribution
- Manufacturing & Maintenance Management

These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree.

The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling.

Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.
NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.

Curriculum Outline Table:

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Distribution	Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Distribution
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.	The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.
The industrial distribution concentration is designed for students who wish to pursue a career in the transportation of goods both nationally and	The industrial distribution concentration is designed for students who wish to pursue a career in the transportation of goods both nationally and internationally. This

internationally. This concentration is concerned with a logistical approach to the movement of products. The industrial distribution concentration lends itself to gaining a marketing minor.		concentration is concerned with a logistical approach to the movement of products. The industrial distribution concentration lends itself to gaining a marketing minor.	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6	English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6
Fine Arts: See general Education Courses	3	Fine Arts: See general Education Courses	3
Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11	Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11
Extra Science (if appropriate)		Extra Science (if appropriate)	
Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9	Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9
Humanities: See General Education Courses	6	Humanities: See General Education Courses	6
Social/Behavioral Sciences: See General Education Courses[1]	6	Social/Behavioral Sciences: See General Education Courses[1]	6
Major Core Courses:	59 Hours	**Major Core Courses:**	59 Hours
TKI 1203 Industrial Communications	3	**INDT 1203 Industrial Drafting and Print Reading**	3
TKI 1814 Basic Industrial Electricity and Electronics	4	**INDT 1814 Basic Industrial Electricity and Electronics**	4
TKI 2113 Introduction to PLC Programming	3	**INDT 2113 Introduction to PLC Programming**	3
TKI 2123 Introduction to CNC Programming	3	**INDT 2123 Introduction to CNC Programming**	3
TKI 2323 Welding Technology	3	**INDT 2323 Welding Technology**	3
TKI 3044 Industrial Safety	4	**INDT 2613 Industrial Fluid Power**	3
TKI 3063 Industrial Human Relations	3	**INDT 3044 Industrial Safety**	4
TKI 3104 Advanced Industrial Electricity and Electronics	4	**INDT 3063 Industrial Human Relations**	3
TKI 3223 Industrial Materials Technology	3	**INDT 3104 Advanced Industrial Electricity and Electronics**	4
TKI 3243 Industrial Metrology	3	**INDT 3223 Industrial Materials Technology**	3
TKI 3343 CAD/CAM	3	**INDT 3243 Industrial Metrology**	3
TKI 3363 Motion and Time Study	3	**INDT 3343 3D Modeling for Manufacture**	3
TKI 3373 Forecasting and Cost Modeling	3	**INDT 3363 Motion and Time Study**	3
TKI 3683 CNC Machining Processes	3	**INDT 3373 Forecasting and Cost**	3
TKI 3813 Writing for Industry	3		
TKI 4113 Industrial Fluid Power	3		
TKI 4213 Survey of Energy Sources and	3		

Power Technology *TKI 4224 Quality Assurance* *TKI 4801 Senior Seminar*	3 4 1	**Modeling** **INDT 3683 CNC Machining Processes** **INDT 3813 Writing for Industry** **INDT 4213 Survey of Energy Sources and Power Technology** **INDT 4224 Quality Assurance** **INDT 4801 Senior Seminar**	 3 3 3 4 1
Industrial Distribution Concentration Courses: MKT 3013 Principles of Marketing MKT 4113 Personal Selling MKT 4123 Advertising MKT Electives: TKI Electives: Approved MKT Electives: MKT 3323 International Logistics MKT 4033 International Transportation MKT 4313 Physical Distribution Management MKT 4333 International Supply Chain Management Approved TKI Electives: *TKI 4103 Industrial Control Systems* *TKI 4203 Automated Systems* *TKI 4233 Maintenance Management* *TKI 4263 Manufacturing Technology and Processing* *TKI 4303 Industrial Robotics* *TKI 4343 CADCAM II* *TKI 4373 Lean Six Sigma* *TKI 4403 Automated Systems II* *TKI 4463 Manufacturing Technology and Processing II*	24 Hours 3 3 3 6 6	Industrial Distribution Concentration Courses: MKT 3013 Principles of Marketing MKT 4113 Personal Selling MKT 4123 Advertising MKT Electives: TKI Electives: Approved MKT Electives: MKT 3323 International Logistics MKT 4033 International Transportation MKT 4313 Physical Distribution Management MKT 4333 International Supply Chain Management **Approved INDT Electives:** **INDT 4103 Industrial Control Systems** **INDT 4203 Automated Systems** **INDT 4233 Maintenance Management** **INDT 4263 Manufacturing Technology and Processing** **INDT 4303 Industrial Robotics** **INDT 4343 Computer Aided Drafting and Design** **INDT 4373 Lean Six Sigma** **INDT 4403 Automated Systems II** **INDT 4463 Manufacturing Technology and Processing II**	24 Hours 3 3 3 6 9
Total Hours	124	Total Hours	124
Footnotes[1] EC 2113 and EC 2123 recommended for business minor * Required for general business administration minor		Footnotes[1] EC 2113 and EC 2123 recommended for business minor * Required for general business administration minor	

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Automation	Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Automation
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.	The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.
The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment. This concentration lends	The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment. This concentration

itself to a general business administration minor.		lends itself to a general business administration minor.	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6	English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6
Fine Arts: See general Education Courses	3	Fine Arts: See general Education Courses	3
Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11	Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11
Extra Science (if appropriate)		Extra Science (if appropriate)	
Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9	Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9
Humanities: See general Education Courses	6	Humanities: See general Education Courses	6
Social/Behavioral Sciences: See general Education Courses[1]	6	Social/Behavioral Sciences: See general Education Courses[1]	6
Major Core Courses:	59 Hours	**Major Core Courses:**	59 Hours
TKI 1203 Industrial Communications	3	**INDT 1203 Industrial Drafting and Print Reading**	3
TKI 1814 Basic Industrial Electricity and Electronics	4	**INDT 1814 Basic Industrial Electricity and Electronics**	4
TKI 2113 Introduction to PLC Programming	3	**INDT 2113 Introduction to PLC Programming**	3
TKI 2123 Introduction to CNC Programming	3	**INDT 2123 Introduction to CNC Programming**	3
TKI 2323 Welding Technology	3	**INDT 2323 Welding Technology**	3
TKI 3044 Industrial Safety	4	**INDT 2613 Industrial Fluid Power**	3
TKI 3063 Industrial Human Relations	3	**INDT 3044 Industrial Safety**	4
TKI 3104 Advanced Industrial Electricity and Electronics	4	**INDT 3063 Industrial Human Relations**	3
TKI 3223 Industrial Materials Technology	3	**INDT 3104 Advanced Industrial Electricity and Electronics**	4
TKI 3243 Industrial Metrology	3	**INDT 3223 Industrial Materials Technology**	3
TKI 3343 CAD/CAM	3	**INDT 3243 Industrial Metrology**	3
TKI 3363 Motion and Time Study	3	**INDT 3343 3D Modeling for Manufacture**	3
TKI 3373 Forecasting and Cost Modeling	3	**INDT 3363 Motion and Time Study**	3
TKI 3683 CNC Machining Processes	3	**INDT 3373 Forecasting and Cost Modeling**	3
TKI 3813 Writing for Industry	3		
TKI 4113 Industrial Fluid Power	3		
TKI 4213 Survey of Energy Sources and Power Technology	3		

TKI 4224 Quality Assurance *TKI 4801 Senior Seminar*	4 1	**INDT 3683 CNC Machining Processes** **INDT 3813 Writing for Industry** **INDT 4213 Survey of Energy Sources and Power Technology** **INDT 4224 Quality Assurance** **INDT 4801 Senior Seminar**	3 3 3 4 1
Industrial Automation Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business *TKI 4103 Industrial Control Systems* *TKI 4203 Automated Systems* *TKI 4233 Maintenance Management* *TKI 4303 Industrial Robotics* *TKI 4403 Automated Systems II* TKI Elective: Approved Electives: *TKI 4343 CADCAM II* *TKI 4373 Lean Six Sigma* *TKI 4263 Manufacturing Technology and Processing*	24 Hours 3 3 3 3 3 3 3	Industrial Automation Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business **INDT 4103 Industrial Control Systems** **INDT 4203 Automated Systems** **INDT 4233 Maintenance Management** **INDT 4303 Industrial Robotics** **INDT 4403 Automated Systems II** INDT Elective: Approved Electives: **INDT 4343 Computer Aided Drafting and Design** **INDT 4373 Lean Six Sigma** **INDT 4263 Manufacturing Technology and Processing**	24 Hours 3 3 3 3 3 3 3 3
Total Hours	124	Total Hours	124
Footnotes[1] EC 2113 and EC 2123 recommended for business minors * Required for general business administration minor		Footnotes[1] EC 2113 and EC 2123 recommended for business minors * Required for general business administration minor	

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Industrial Technology Concentration: Manufacturing and Maintenance Management	Degree: Bachelor of Science Major: Industrial Technology Concentration: Manufacturing and Maintenance Management
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.	The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into three concentrations: • Industrial Automation • Industrial Distribution • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence. NOTE: This curriculum lends itself well to a minor in Business Administration or Marketing.
The manufacturing and maintenance management concentration is designed for students who want to enter a career in the manufacturing sector. This concentration is concerned with the management, maintenance and day-to-day operation and improvement of manufacturing	The manufacturing and maintenance management concentration is designed for students who want to enter a career in the manufacturing sector. This concentration is concerned with the management, maintenance and day-to-day operation and improvement of

processes. This concentration lends itself to a general business administration minor.		manufacturing processes. This concentration lends itself to a general business administration minor.	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours
English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6	English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6
Fine Arts: See general Education Courses	3	Fine Arts: See general Education Courses	3
Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11	Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11
Extra Science (if appropriate)		Extra Science (if appropriate)	
Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9	Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9
Humanities: See general Education Courses	6	Humanities: See general Education Courses	6
Social/Behavioral Sciences: See general Education Courses[1]	6	Social/Behavioral Sciences: See general Education Courses[1]	6
Major Core Courses:	59 Hours	**Major Core Courses:**	59 Hours
TKI 1203 Industrial Communications	3	**INDT 1203 Industrial Drafting and Print Reading**	3
TKI 1814 Basic Industrial Electricity and Electronics	4	**INDT 1814 Basic Industrial Electricity and Electronics**	4
TKI 2113 Introduction to PLC Programming	3	**INDT 2113 Introduction to PLC Programming**	3
TKI 2123 Introduction to CNC Programming	3	**INDT 2123 Introduction to CNC Programming**	3
TKI 2323 Welding Technology	3	**INDT 2323 Welding Technology**	3
TKI 3044 Industrial Safety	4	**INDT 2613 Industrial Fluid Power**	3
TKI 3063 Industrial Human Relations	3	**INDT 3044 Industrial Safety**	4
TKI 3104 Advanced Industrial Electricity and Electronics	4	**INDT 3063 Industrial Human Relations**	3
TKI 3223 Industrial Materials Technology	3	**INDT 3104 Advanced Industrial Electricity and Electronics**	4
TKI 3243 Industrial Metrology	3	**INDT 3223 Industrial Materials Technology**	3
TKI 3343 CAD/CAM	3	**INDT 3243 Industrial Metrology**	3
TKI 3363 Motion and Time Study	3	**INDT 3343 3D Modeling for Manufacture**	3
TKI 3373 Forecasting and Cost Modeling	3	**INDT 3363 Motion and Time Study**	3
TKI 3683 CNC Machining Processes	3	**INDT 3373 Forecasting and Cost Modeling**	3
TKI 3813 Writing for Industry	3	**INDT 3683 CNC Machining Processes**	3
TKI 4113 Industrial Fluid Power	3		
TKI 4213 Survey of Energy Sources and Power Technology	3		
TKI 4224 Quality Assurance	4		

TKI 4801 Senior Seminar	1	**INDT 3813 Writing for Industry** **INDT 4213 Survey of Energy Sources and Power Technology** **INDT 4224 Quality Assurance** **INDT 4801 Senior Seminar**	3 3 4 1
Manufacturing & Maintenance Management Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business *TKI 4103 Industrial Control Systems* *TKI 4233 Maintenance Management* *TKI 4263 Manufacturing Technology and Processing* *TKI 4373 Lean Six Sigma* *TKI 4463 Manufacturing Technology and Processing II* *TKI Elective* *Approved Electives:* *TKI 4203 Automated Systems* *TKI 4303 Industrial Robotics* *TKI 4343 CADCAM II*	24 Hours 3 3 3 3 3 3 3	Manufacturing & Maintenance Management Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business **INDT 4103 Industrial Control Systems** **INDT 4233 Maintenance Management** **INDT 4263 Manufacturing Technology and Processing** **INDT 4373 Lean Six Sigma** **INDT 4463 Manufacturing Technology and Processing II** INDT Elective Approved Electives: **INDT 4203 Automated Systems** **INDT 4303 Industrial Robotics** **INDT 4343 Computer Aided Drafting and Design**	24 Hours 3 3 3 3 3 3 3
Total Hours	124	Total Hours	124
Footnotes[1] EC 2113 and EC 2123 recommended for business minors * Required for general business administration minor		Footnotes[1] EC 2113 and EC 2123 recommended for business minors * Required for general business administration minor	

Justification and Student Learning Outcomes:
The industrial technology faculty have proposed these modifications after reviewing the curriculum. The major modification we propose is to change the course prefixes from TKI to INDT. Our department offers TKI, TKT, and TKB courses and it can become confusing not only to students, but faculty, which prefix is for which program. To simplify this, we are asking for all TKI prefixes to be changed to INDT, which is also the program four-letter code. This will clearly differentiate industrial technology courses from others offered in the department.

Since our lasts program modification, we have seen several equipment and laboratory changes within the department. These changes include the purchase of a new mechatronics laboratory, in which students can work on a fully automated plant, including programming and maintenance of the equipment. For this reason, the faculty felt that our Industrial Fluid Power course, TKI 4113, should be a prerequisite for the automation classes. In addition, many of our students are transfers who have this fluid power course already from community college. The faculty felt that the course should change for a 4000 level to a 2000 level, INDT 2613, to better articulate courses from community colleges and to make all the prerequisites for the 4000 level automation classes be at a sophomore level.

All of our drafting classes have had name changes to better show what they are and to avoid any ambiguity for students as to what the class is. This means that TKI 1203 Industrial Communications becomes INDT 1203 Industrial Drafting and Print Reading, TKI 3343 CADCAM becomes INDT 3343 Modeling for manufacture, and TKI 4343 CADCAM II becomes INDT 4343 Computer Aided Drafting and Design.

Currently there is a major shortfall in qualified technical employees in industry, not just in Mississippi but nationally too. These proposed changes will give graduating students the ability to find employment in high qualification technical positions.

The modifications do not duplicate any programs are currently in the system. The current program has a good cross-section of students and this is anticipated to remain the same.

The industrial technology program at Mississippi State University has a very high placement rates, and salaries are consummate with those of graduating industrial engineers. As the demand for more highly qualified technicians increases, the placement rates and salaries should also increase.

The learning outcomes of this program are that students should be able to facilitate ideas from senior management to the production floor. They could also be able to manage the day-to-day operations, maintenance, and production troubleshooting of complex industrial equipment and systems. The graduate student should also be able to make recommendations on adaptation, deletion, or replacement/capital investment of equipment to aid the manufacturing process.

Support:
Accompanying this degree program modification is a letter of support signed by all the faculty in the industrial technology program. The faculty unanimously voted to support the proposed degree program changes for the industrial technology curriculum.

4-Letter Abbreviation:
The 4-letter abbreviation for the program is – INDT

Effective Date:
The proposed effective date is spring 2020

Will this program change meet local, state, regional, and national educational and cultural needs? If so, please describe.

No. This is purely a housekeeping exercise to avoid confusion for students, employers, and faculty etc. The program already is meeting the educational and cultural needs for all stakeholders.

Will this program change result in duplication in the System? If so, please describe.

No. This is purely a housekeeping exercise to avoid confusion for students, employers, and faculty etc. and will have zero duplication within the system.

Will this program change/advance student diversity within the discipline? If so, please describe.

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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.

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No. This is purely a housekeeping exercise to avoid confusion for students, employers, and faculty etc. and will have zero duplication within the system. Students already graduate with a mean starting salary of $58,000. Any increase in potential salaries will be driven by the employment market, which currently is undergoing a shortage in technologists in the advanced manufacturing area.

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, along with all required copies, to UCCC, Garner Hall, Room 279, Mail Stop 9702.

College: Education **Department:** ISWD

Contact Person: Dr. John Wyatt **Mail Stop:** 9730 **E-mail:** wyatt@colled.msstate.edu

Nature of Change: Modification **Date Initiated:** 02/11/2019 **Effective Date:** Spring 2020

Degree to be offered at: Campus 5

Current Degree Program Name: BS Industrial Technology

Major: Industrial Technology **Concentration:** Industrial Automation, Manufacturing & Maintenance Management

New Degree Program Name:

Major: **Concentration:**

Summary of Proposed Changes: See attached sheet.

Approved:	*Date:*
Department Head	3-21-19
Chair, College or School Curriculum Committee	4-8-19
Dean of College or School	4-8-19
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council (if applicable)	
Chair, Deans Council	

☐ IHL Action Required

☐ SACS Letter Sent

A summary of the proposed changes for the Industrial Technology degree are as follows:

All TKI prefixes to be changed to INDT

Modification – name change - TKI 1203 Industrial Communication to INDT 1203 Industrial Drafting and Print Reading

Modification – name change - TKI 3343 CADCAM to INDT 3343 3D Modeling for Manufacture

Modification – course number change - TKI 4113 Industrial Fluid Power to INDT 2613 Industrial Fluid Power

Modification – name change – TKI 4343 CADCAM II to INDT 4343 Computer Aided Drafting and Design

Catalog Description (Old):
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics.

To this extent the curriculum is divided into two concentrations:
- Industrial Automation
- Manufacturing & Maintenance Management

These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree.

The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling.

Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.

The manufacturing and maintenance management concentration is designed for students who want to enter a career in the manufacturing sector. This concentration is concerned with the

management, maintenance and day-to-day operation and improvement of manufacturing processes.

The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment.

Catalog Description (New):
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics.

To this extent the curriculum is divided into two concentrations:
- Industrial Automation
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The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling.

Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.

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The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment.

Curriculum Outline Table:

CURRENT Degree Description		PROPOSED Degree Description	
Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Automation		Degree: Bachelor of Science Major: Industrial Technology Concentration: Industrial Automation	
The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into two concentrations: • Industrial Automation • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.		The industrial technology curriculum is designed for students who want to prepare for employment leading to supervisory and management positions in the production, automation, maintenance or logistics areas of industry. The role of the Industrial Technology graduate is that of a facilitator of ideas from senior management to the production floor. Successful completion of the four-year curriculum would provide an excellent background in science, mathematics, design and human relations. This is coupled with the practical use of both manual and automated machinery and the associated tools, as well as knowledge of industrial manufacturing processes, materials and logistics. To this extent the curriculum is divided into two concentrations: • Industrial Automation • Manufacturing & Maintenance Management These concentrations are designed to give students a specialization that they can take into the workforce and build upon throughout their industrial career. Graduates should quickly become proficient in both the supervisory and administrative roles of dealing with personnel, and depending upon the concentration selected, the graduate should become adept in the various aspects of the manufacture, distribution and automation of industrial products and processes. Employment opportunities are excellent for this degree. The MSU Bulletin is not the final source of information. Departmental advisement is critically important for the course sequence and selection. Students should always get advisement and approval from their MSU advisor for course scheduling. Upper division courses (3000 level and up) must be taken at a senior college or university. See a faculty advisor for prerequisites and proper course sequence.	
The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment.		The industrial automation concentration is designed for students who wish to enter a career in the automation of manufacturing processes. This concentration is concerned with fixed automation, robotics, and the troubleshooting of automated systems and their role in the manufacturing environment.	
CURRENT CURRICULUM OUTLINE	Required Hours	**PROPOSED CURRICULUM OUTLINE**	Required Hours

English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6	English: EN 1103English Composition I or EN 1163 Accelerated Composition I EN 1113English Composition II or EN 1173 Accelerated Composition II	6
Fine Arts: See general Education Courses	3	Fine Arts: See general Education Courses	3
Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11	Natural Sciences: CH 1043 Survey of Chemistry I CH 1051 Experimental Chemistry PH 1013Physical Science Survey I PH 1011 Physical Science Survey I Lab PH 1023 Physical Science Survey II	11
Extra Science (if appropriate)		Extra Science (if appropriate)	
Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9	Math: MA 1323 Trigonometry MA 1613 Calculus for Business and Life Sciences I or MA 1713 Calculus I BQA 2113 Business Statistical Methods I* or MA 2113 Introduction to Statistics or ST 2113 Introduction to Statistics	9
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:	59 Hours	**Major Core Courses:**	59 Hours
TKI 1203 Industrial Communications	3	**INDT 1203 Industrial Drafting and Print Reading**	3
TKI 1814 Basic Industrial Electricity and Electronics	4	**INDT 1814 Basic Industrial Electricity and Electronics**	4
TKI 2113 Introduction to PLC Programming	3	**INDT 2113 Introduction to PLC Programming**	3
TKI 2123 Introduction to CNC Programming	3	**INDT 2123 Introduction to CNC Programming**	3
TKI 2323 Welding Technology	3	**INDT 2323 Welding Technology**	3
TKI 3044 Industrial Safety	4	**INDT 2613 Industrial Fluid Power**	3
TKI 3063 Industrial Human Relations	3	**INDT 3044 Industrial Safety**	4
TKI 3104 Advanced Industrial Electricity and Electronics	4	**INDT 3063 Industrial Human Relations**	3
TKI 3223 Industrial Materials Technology	3	**INDT 3104 Advanced Industrial Electricity and Electronics**	4
TKI 3243 Industrial Metrology	3	**INDT 3223 Industrial Materials Technology**	3
TKI 3343 CAD/CAM	3	**INDT 3243 Industrial Metrology**	3
TKI 3363 Motion and Time Study	3	**INDT 3343 3D Modeling for Manufacture**	3
TKI 3373 Forecasting and Cost Modeling	3	**INDT 3363 Motion and Time Study**	3
TKI 3683 CNC Machining Processes	3	**INDT 3373 Forecasting and Cost Modeling**	3
TKI 3813 Writing for Industry	3	**INDT 3683 CNC Machining Processes**	3
TKI 4113 Industrial Fluid Power	3	**INDT 3813 Writing for Industry**	3
TKI 4213 Survey of Energy Sources and Power Technology	3	**INDT 4213 Survey of Energy Sources and Power Technology**	3
TKI 4224 Quality Assurance	4		
TKI 4801 Senior Seminar	1		

		INDT 4224 Quality Assurance **INDT 4801 Senior Seminar**	4 1
Industrial Automation Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business *TKI 4103 Industrial Control Systems* *TKI 4203 Automated Systems* *TKI 4233 Maintenance Management* *TKI 4303 Industrial Robotics* *TKI 4403 Automated Systems II* TKI Elective: Approved Electives: *TKI 4343 CADCAM II* *TKI 4373 Lean Six Sigma* *TKI 4263 Manufacturing Technology and Processing*	24 Hours 3 3 3 3 3 3 3	Industrial Automation Concentration Courses: ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting BL 2413 The Legal Environment of Business **INDT 4103 Industrial Control Systems** **INDT 4203 Automated Systems** **INDT 4233 Maintenance Management** **INDT 4303 Industrial Robotics** **INDT 4403 Automated Systems II** **INDT Approved Electives:** **INDT 4343 Computer Aided Drafting and Design** **INDT 4373 Lean Six Sigma** **INDT 4263 Manufacturing Technology and Processing**	24 Hours 3 3 3 3 3 3 3 3
Total Hours	124	Total Hours	124

CURRENT Degree Description	PROPOSED Degree Description
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TKI 4113 Industrial Fluid Power	3	**INDT 3813 Writing for Industry**	3
TKI 4213 Survey of Energy Sources and Power Technology	3	**INDT 4213 Survey of Energy Sources and Power Technology**	3
TKI 4224 Quality Assurance	4	**INDT 4224 Quality Assurance**	4
TKI 4801 Senior Seminar	1	**INDT 4801 Senior Seminar**	1

Manufacturing & Maintenance Management Concentration Courses:	24 Hours	Manufacturing & Maintenance Management Concentration Courses:	24 Hours
ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting	3	ACC 2013 Principles of Financial Accounting* or ACC 2203 Survey of Accounting	3
BL 2413 The Legal Environment of Business	3	BL 2413 The Legal Environment of Business	3
TKI 4103 Industrial Control Systems	3	**INDT 4103 Industrial Control Systems**	3
TKI 4233 Maintenance Management	3	**INDT 4233 Maintenance Management**	3
TKI 4263 Manufacturing Technology and Processing	3	**INDT 4263 Manufacturing Technology and Processing**	3
TKI 4373 Lean Six Sigma	3	**INDT 4373 Lean Six Sigma**	3
TKI 4463 Manufacturing Technology and Processing II	3	**INDT 4463 Manufacturing Technology and Processing II**	3
TKI Elective *Approved Electives:* *TKI 4203 Automated Systems* *TKI 4303 Industrial Robotics* *TKI 4343 CADCAM II*	3	**INDT Approved Electives:** **INDT 4203 Automated Systems** **INDT 4303 Industrial Robotics** **INDT 4343 Computer Aided Drafting and Design**	3
Total Hours	124	Total Hours	124

Justification and Student Learning Outcomes:
The industrial technology faculty have proposed these modifications after reviewing the curriculum. The major modification we propose is to change the course prefixes from TKI to INDT. Our department offers TKI, TKT, and TKB courses and it can become confusing not only to students, but faculty, which prefix is for which program. To simplify this, we are asking for all TKI prefixes to be changed to INDT, which is also the program four-letter code. This will clearly differentiate industrial technology courses from others offered in the department.

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program has a good cross-section of students and this is anticipated to remain the same.

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Support:
Accompanying this degree program modification is a letter of support signed by all the faculty in the industrial technology program. The faculty unanimously voted to support the proposed degree program changes for the industrial technology curriculum.

4-Letter Abbreviation:
The 4-letter abbreviation for the program is – INDT

Effective Date:
The proposed effective date is spring 2020

Will this program change meet local, state, regional, and national educational and cultural needs? If so, please describe.

No. This is purely a housekeeping exercise to avoid confusion for students, employers, and faculty etc. The program already is meeting the educational and cultural needs for all stakeholders.

Will this program change result in duplication in the System? If so, please describe.

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Will this program change/advance student diversity within the discipline? If so, please describe.

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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.

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Will this program change result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S.? If so, please describe.

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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:** Agricultural and Biological Engineering

Contact Person: Anna Linhoss **Mail Stop:** 9632 **E-mail:** alinhoss@abe.msstate.edu

Nature of Change: Change in coursework requirement **Date Initiated:** February 20, 2019

Effective Date: January 1, 2020

Current Degree Program Name: Ph.D. in Engineering with a concentration in Biological Engineering

Major: Engineering **Concentration:** Biological Engineering

New Degree Program Name: N/A

Major: N/A **Concentration:** N/A

Summary of Proposed Changes:

We propose to decrease the required coursework for a PhD in Engineering with a Concentration in Biological Engineering from 63 hours to 48 hours. This change will:

1) Align Mississippi State University (MSU) with the curriculum of our peer and peer plus universities.
2) Align Biological Engineering with the degree requirements for Biomedical Engineering at MSU.
3) Align Biological Engineering with the degree requirements for other engineering departments at MSU.
4) Allow students more time to focus more on their dissertation and build independent research skills.

Approved:	Date:
Department Head	3/29/19
Chair, College or School Curriculum Committee	4/8/19
Dean of College or School	4/9/19
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: Ph.D. Major: Engineering Concentration: Biological Engineering		Degree: No change Major: Concentrations:	
Biological Engineering is that branch of the engineering profession which deals with engineering problems encountered in biological systems. The responsibilities of the Biological Engineer may include finding solutions to address the need for more complex food-producing systems, controlling and monitoring the deterioration of the earth's environment, the replacement of living organs, design and testing of artificial and engineered tissues, the use of new technologies to assist the disabled, and the creation of new engineering designs based on the inherently creative characteristics of living systems.		No change	
CURRENT CURRICULUM OUTLINE	Hours	**PROPOSED CURRICULUM OUTLINE**	Hours
MA XXXX Graduate mathematics course	3	MA XXXX Graduate mathematics course	3
ABE XXXX Graduate-level coursework	**48**	**Graduate-level coursework**	**33**
8000-level coursework	10	8000-level coursework	10
Select two of the following: • ABE 8911: Agricultural and Biological Engineering Seminar • ABE 8921: Agricultural and Biological Engineering Seminar	2	Select two of the following: • ABE 8911: Agricultural and Biological Engineering Seminar • ABE 8921: Agricultural and Biological Engineering Seminar	2
Dissertation/Research 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 60 credit hours of coursework beyond the baccalaureate degree and complete 20 hours of dissertation research**.	**20**	Dissertation/Research 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 and complete 20-32 hours of dissertation research.**	**20-32**
Total Hours	80	Total Hours	68-80

JUSTIFICATION AND STUDENT LEARNING OUTCOMES

We propose to decrease the required coursework for a PhD in Engineering with a Concentration in Biological Engineering from 63 hours to 48 hours. This change will:

1) **Align Mississippi State University (MSU) with the curriculum of our peer and peer plus universities.** The coursework requirements for a PhD in Biological Engineering at peer and peer plus schools is shown in Table 1. At the six schools listed course requirements vary from 'at the committee's discretion', to 64 hours. MSU's current coursework requirement of 63 hours places us at the upper limit of our peer and peer plus universities. Reducing the required coursework for a Ph.D. in Biological Engineering at MSU will better align us with the requirements at our peer and peer plus universities.

Table 1. Course requirements for peer and peer plus universities in Biological Engineering.

US News and World Report Ranking (ABE departments)	School	ABE PhD coursework degree requirements beyond BS
1	Purdue	42 hours
2	Iowa State	43 hours
3	Texas A&M	36 hours
4	Univ. of Florida	54 hours
5 (tied)	Univ. of Illinois (UC)	64 hours
5 (tied)	Cornell	At the committee's discretion
	Mississippi State	**Existing 63 hours. Proposed 48 hours**

2) **Align Biological Engineering with the degree requirements for Biomedical Engineering at MSU.** The coursework requirements for a PhD in Biomedical Engineering in the Department of Agricultural and Biological Engineering at MSU is shown in Table 2. A Ph.D. in Biomedical Engineering requires a total of 48 hours of coursework while a Ph.D. in Biological Engineering from the same department requires 63 hours of coursework. Thus, reducing the required coursework for a Ph.D. in Biological Engineering will align us with the requirements for a Ph.D. in Biomedical Engineering.

Table 2. Coursework requirements for a Ph.D. in Biological Engineering in the Department of Agricultural and Biological Engineering at MSU.

ABE 8511	Journal Reviews in Biomedical Engineering	1
ABE 8801	Clinical Experience for Biomedical Engineering	1
BIO 6514 or BIO 6114	Animal Physiology Cellular Physiology	4
ST 8114	Statistical Methods	4
8000-level or higher coursework		6
ABE XXXX	Graduate-level mathematics coursework	3
Additional Graduate level Coursework		29
Dissertation/Research		20-32
Total Hours		80

3) **Align Biological Engineering with the degree requirements for other engineering departments at MSU**. In the College of Engineering, at MSU, the average coursework requirement is 44.8 hours (Table 3). At 63 required hours, Biological Engineering ranks second in the highest coursework requirements. Reducing the required coursework for a Ph.D. in Biological Engineering from 63 to 48 hours will align us with the requirements for a Ph.D. in other engineering departments at MSU.

Table 3. Coursework requirements for all Ph.D. Engineering degrees at MSU.

MSU Engineering Degree	**Course Requirements**
Ph.D. with Aerospace Engineering Concentration	30
Ph.D. in Engineering with Concentration in Biological Engineering	**63**
Ph.D. in Engineering with Applied Physics Concentration	18
Ph.D. in Biomedical Engineering	48
Ph.D. in Engineering with Chemical Engineering Concentration	36
Ph.D. in Engineering with Civil Engineering Concentration	75
Ph.D. in Computational Engineering	48
Ph.D. in Computer Science	43
Ph.D. in Electrical and Computer Engineering	42
Ph.D. in Industrial and Systems Engineering	48
Ph.D. in in Engineering with Mechanical Engineering Concentration	42

4) **Allow students more time to focus more on their dissertation and build independent research skills.**

At the Ph.D. level, students should learn how to think independently and cultivate the ability to develop and answer complex research problems. Within this context, coursework should fill gaps in knowledge; however, the majority of time should be spent on independent research. 63 hours of coursework is the equivalent of 21 3-hour courses or 3 full years of graduate coursework. Reducing the coursework load from 63 to 48 hours would allow Biological Engineering Ph.D. students more time to focus on innovative research and produce peer-reviewed publications.

SUPPORT

See attached

PROPOSED 4-LETTER ABBREVIATION

No Change

EFFECTIVE DATE

January 1, 2020

MISSISSIPPI STATE UNIVERSITY

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

February 20, 2019

RE: The modification of coursework requirements for a Ph.D. in Engineering with Concentration in Biological Engineering

To: The University Committee on Courses and Curricula

The Department of Agricultural and Biological Engineering proposes to decrease the required coursework for a Ph.D. in Engineering with Concentration in Biological Engineering from 63 hours to 48 hours. This change will:

1. Align Mississippi State University (MSU) with the curriculum of our peer and peer plus universities.
2. Align Biological Engineering with the degree requirements for Biomedical Engineering at MSU.
3. Align Biological Engineering with the degree requirements for other engineering departments at MSU.
4. Allow students more time to focus more on their dissertation and build independent research skills.

The teaching faculty in the ABE department voted in support of these changes.

Approved: Date:

Biological Engineering Graduate Coordinator — 3/29/2019

Department Head — 3/29/19

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, along with all required copies, to UCCC, Garner Hall, Room 279, Mail Stop 9702.

College: Engineering **Department: Industrial & Systems Engineering**

Contact Person: John M. Usher **Mail Stop: 9542** **E-mail: usher@ise.msstate.edu**

Nature of Change: Modification **Date Initiated: 03/27/19** **Effective Date: Fall 2020**

Degree to be offered at: Starkville (Campus 1)

Current Degree Program Name: Bachelor of Science

Major: Industrial Engineering **Concentration:**

New Degree Program Name:

Major: **Concentration:**

Summary of Proposed Changes:

- Adds three elective courses (9-hours) to the curriculum in the form of (1) another *IE-course specific* elective, (2) a *professional development* elective, and (3) an *approved* elective.
- Added a programming course requirement in the form of a *computer programming elective.*
- Expands the list of courses for both the *math/science elective* and *engineering science electives* to give students greater flexibility in defining what specific math/science course and engineering topics they would like to study.
- Replaced IE 4513 – Engineering Administration with an engineering management elective permitting students to teach either IE 4513 (Engineering Administration) or an existing project management course (IE 4533).
- Replaced our current introductory course, IE 1911 Introduction to IE, with a new freshmen level course – IE 1313 Lean Work Systems.
- Removed one laboratory course, IE 3121, Industrial Ergonomics Laboratory
- Reduced the credit hours of two courses (IE 4934 and IE 4915) by 1-credit hour each.

Approved: John M Usher Department Head	***Date:*** 3/26/19
Cindy D. Reeves Chair, College or School Curriculum Committee	4/8/19
Dean of College or School	4/9/19
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council (if applicable)	
Chair, Deans Council	

☐ IHL Action Required

☐ SACS Letter Sent

Proposal for the Modification of the BS in Industrial Engineering

1. CATALOG DESCRIPTION

No changes proposed.

2. CURRICULUM OUTLINE

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science Major: Industrial Engineering Concentration:	Degree: Bachelor of Science Major: Industrial Engineering Concentration:
Industrial and systems engineering is the application of engineering methods and the principles of scientific management to the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy. The industrial and systems engineer is concerned with the design of total systems, and is the leader in the drive for increased productivity and quality improvement. The industrial and systems engineering profession uses a variety of specialized knowledge and skills. These include communications, economics, mathematics, physical and social sciences, together with the methods of engineering analysis and design. The industrial and systems engineer is often involved in designing or improving major systems that encompass the total organization. Consequently, he/she is often in contact with individuals from many segments of the organization. From his/her education and these experiences, the industrial and systems engineer develops a global view of the many inter-related operations necessary to deliver a firm's goods and services. Because of their management skills and global view of the organization, a large proportion of industrial and systems engineers move into management, and later advance into top management positions. Although industrial and systems engineering is especially important to all segments of industry, it is also applied in other types of organizations, such as transportation, health care, public utilities, agriculture, defense, government, merchandising, distribution, logistics, and other service sectors. With increasing emphasis on quality and productivity for successful international competition, it is expected that industrial and systems engineers will be in increasing demand in the coming decades.	Industrial and systems engineering is the application of engineering methods and the principles of scientific management to the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy. The industrial and systems engineer is concerned with the design of total systems, and is the leader in the drive for increased productivity and quality improvement. The industrial and systems engineering profession uses a variety of specialized knowledge and skills. These include communications, economics, mathematics, physical and social sciences, together with the methods of engineering analysis and design. The industrial and systems engineer is often involved in designing or improving major systems that encompass the total organization. Consequently, he/she is often in contact with individuals from many segments of the organization. From his/her education and these experiences, the industrial and systems engineer develops a global view of the many inter-related operations necessary to deliver a firm's goods and services. Because of their management skills and global view of the organization, a large proportion of industrial and systems engineers move into management, and later advance into top management positions. Although industrial and systems engineering is especially important to all segments of industry, it is also applied in other types of organizations, such as transportation, health care, public utilities, agriculture, defense, government, merchandising, distribution, logistics, and other service sectors. With increasing emphasis on quality and productivity for successful international competition, it is expected that industrial and systems engineers will be in increasing demand in the coming decades.

The objectives of the Department of Industrial and Systems Engineering are founded in Mississippi State University's educational philosophy and in the industrial engineering profession. They were developed to satisfy the needs of the department's constituents: students, employers, alumni, faculty, and the industrial engineering profession. The Industrial Engineering program objective is to graduate students having a broad education, with emphasis in industrial and systems engineering fundamentals and practices, which enables them to function effectively in systems involving people, materials, information, energy, and money. The *six* educational objectives of the Bachelor of Science degree in industrial engineering are stated below. 1. *The Department of Industrial and Systems Engineering strives to ready its graduates for a lifelong pursuit of learning.* 2. *The Department of Industrial and Systems Engineering expects its graduates to be well versed in industrial engineering theory, know how to apply that theory, and to be capable of functioning effectively in a broad range of organizations.* 3. *The Department of Industrial and Systems Engineering expects its graduates to master important professional skills, including communication, economics, physical and social science, mathematics and statistics.* 4. *The Department of Industrial and Systems Engineering expects its graduates to interact cooperatively in professional situations with individuals having different cultures, training, education, and interest.* 5. *The Department of Industrial and Systems Engineering expects its graduates to think independently, to critically examine ideas, and to make discerning professional judgments, whether intellectual, ethical, or aesthetic.* 6. *The Department of Industrial and Systems Engineering expects to graduate professionally mature, responsible, and informed citizens.* Because of the importance of systems design in the many facets of industrial and systems engineering, instruction of the principles and methods of design is integrated throughout the curriculum of industrial engineering, and culminates in a major design experience in the student's senior year. The Industrial Engineering Program is accredited by the Engineering Accreditation Commission of ABET,http://www.abet.org.	The objectives of the Department of Industrial and Systems Engineering are founded in Mississippi State University's educational philosophy and in the industrial engineering profession. They were developed to satisfy the needs of the department's constituents: students, employers, alumni, faculty, and the industrial engineering profession. The Industrial Engineering program objective is to graduate students having a broad education, with emphasis in industrial and systems engineering fundamentals and practices, which enables them to function effectively in systems involving people, materials, information, energy, and money. The **four** educational objectives of the Bachelor of Science degree in industrial engineering are stated below. 1. **Graduates of the Department of Industrial and Systems Engineering are versed in math, science, and engineering theory, know how to apply that theory, and are capable of functioning effectively producing solutions in a broad range of organizations.** 2. **Graduates of the Department of Industrial and Systems Engineering lead and interact cooperatively in professional situations with individuals having diverse backgrounds, cultures, training, education, and interests.** 3. **Graduates of the Department of Industrial and Systems Engineering think independently, critically examine ideas, and make discerning professional judgments, whether intellectual, ethical, or aesthetic.** 4. **Graduates of the Department of Industrial and Systems Engineering are professionally mature, responsible, and informed citizens who pursue lifelong learning.** Because of the importance of systems design in the many facets of industrial and systems engineering, instruction of the principles and methods of design is integrated throughout the curriculum of industrial engineering, and culminates in a major design experience in the student's senior year. The Industrial Engineering Program is accredited by the Engineering Accreditation Commission of ABET,http://www.abet.org.
n/a	n/a

CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
English EN 1103 English Composition I EN 1113 English Composition II	6	English EN 1103 English Composition I EN 1113 English Composition II	6
Fine Arts: Any Gen. Ed. course	3	Fine Arts: Any Gen. Ed. course	3
Natural Sciences CH 1213 Fundamentals of Chemistry CH 1211 Investigations in Chemistry CH 1223 Fundamentals of Chemistry PH 2213 Physics I PH 2223 Physics II	13	Natural Sciences CH 1213 Fundamentals of Chemistry CH 1211 Investigations in Chemistry CH 1223 Fundamentals of Chemistry PH 2213 Physics I PH 2223 Physics II	13
Mathematics MA 1713 Calculus I MA 1723 Calculus II MA 2733 Calculus III MA 2743 Calculus IV MA 3113 Linear Algebra	15	Mathematics MA 1713 Calculus I MA 1723 Calculus II MA 2733 Calculus III MA 2743 Calculus IV MA 3113 Linear Algebra	15
Humanities: Any Gen. Ed. course	6	Humanities: Any Gen. Ed. course	6
Social Sciences EC 2123 Principles of Microeconomics PSY 1013 General Psychology	6	Social Sciences EC 2123 Principles of Microeconomics PSY 1013 General Psychology	6
Major Core Math/Science Elective[1] Engineering Topics	 3 15	Major Core Math/Science Elective[4] Engineering Topics	 3 12
EM 2413 Engineering Mechanics I __ ____3 Engineering Science Elective[2] __ ____3 Engineering Science Elective[2] *ECE 3413 Intro to Electronic Circuits* *Materials Elective (CHE 3413 or ME 3403*)		EM 2413 Engineering Mechanics I __ ___3 Engineering Science Elective[5] __ ___3 Engineering Science Elective[5] **Computer Programming Elective[6]**	
IE Topics *IE 1911 Introduction to IE* IE 3123 Industrial Ergonomics *IE 3121 Industrial Ergonomics Lab* IE 3323 Manufacturing Processes IE 3913 Engineering Economy I IE 4333 Production Control Systems I *IE 4513 Engineering Administration* IE 4543 Logistics Engineering IE 4613 Engineering Statistics I	50	IE Topics **IE 1313 Lean Work Systems** IE 3123 Industrial Ergonomics IE 3323 Manufacturing Processes IE 3913 Engineering Economy I IE 4333 Production Control Systems I **Engineering Management Elective[7]** IE 4543 Logistics Engineering IE 4613 Engineering Statistics I	52

IE 4623 Engineering Statistics II IE 4653 Quality Engineering IE 4733 Linear Programming I IE 4753 Systems Engineering & Analysis IE 4773 Systems Simulation I *IE 4915* Design of Industrial Systems *IE 4934* Information Systems for IE IE ___3 IE Elective[3] Other GE 3513 Technical Writing ACC 2023 Managerial Accounting *EG 1142 Engineering Graphics* *CO 1003 Fund. of Public Speaking*	11	IE 4623 Engineering Statistics II IE 4653 Quality Engineering IE 4733 Linear Programming I IE 4753 Systems Engineering & Analysis IE 4773 Systems Simulation I **IE 4914** Industrial Systems Design **IE 4933** Information Systems in IE IE ___3 IE Design Elective[8] **IE ___3 IE Design Elective[8]** Other GE 3513 Technical Writing ACC 2023 Managerial Accounting **Professional Enrichment Elective[9]** **Approved Elective[10]**	12
Total Hours	128	Total Hours	128
[1] Math/Science Elective: PH 2233 Physics III MA 3253 Differential Equations I	3	[4] Math/Science Elective: MA 3253 Differential Equations I **MA 3053 Foundation of Math I** **MA 4143 Graph Theory** **MA 4313 Numerical Analysis I** **MA 4533 Probabilistic Random Process** **ST 4213 Nonparametric Methods** PH 2233 Physics III **CH 2313 Analytical Chemistry** **BIO 1134 Biology I** **GG 4153 Engineering Geology** **GG 4233 Applied Geophysics**	3
[2] Engineering Science Electives: *ECE 3424 Interm. Electronic Circuits* EM 2433 Engineering Mechanics II EM 3213 Mechanics of Materials EM 3313 Fluid Mechanics ME 3513 Thermodynamics I	6	[5] Engineering Science Electives: EM 2433 Engineering Mechanics II EM 3213 Mechanics of Materials EM 3313 Fluid Mechanics **ECE 3413 Intro to Electronic Circuits** **ECE 4483 Intro. to Remote Sensing** **ABE 3413 Bioinstrumentation** **ABE 3513 GPS & GIS in Ag. and Eng.** **ABE 4613 Biomechanics** **CE 2803 Environmental Engineering** **CE 3113 Transportation Engineering** **CE 3603 Structural Mechanics** **CHE 2213 Chemical Eng. Analysis** **CHE 3113 Chemical Eng. Thermodyn.** **CHE 3413 Engineering Materials** **ME 3113 Engineering Analysis** **ME 3403 Materials for ME Design** ME 3513 Thermodynamics	6

		[6] Computer Programming Elective: CSE 1233 Computer Programming w/C CSE 1284 Intro to Computer Program.	3
		[7] Engineering Management Elective: IE 4513 Engineering Administration IE 4533 Project Management	3
[3] IE Design Elective - Any three-hour non-required industrial engineering course.	3	[8] IE Design Elective - Any three-hour non-required industrial engineering course.	3
		[9] Professional Enrichment Elective Appropriately titled, the purpose of this elective is to aid students in the enrichment of their undergraduate program in a professional manner. The intent is to help students achieve objectives such as earning a minor or a certificate, preparing for the F.E. Exam, participating in the Study Abroad Program, or additional study in technical, primarily upper-division areas of study.	3
		[10] Approved Elective Students may choose nearly any course or combination of courses totaling three credit hours or more offered at MSU for the Approved Elective. The only exception is that students may not choose remedial courses (courses which are prerequisite to required or previously completed courses), LSK courses, and physical education courses outside of varsity sports. Examples of courses that would directly benefit ISE students include: Engineering Graphics, Foreign language, Finance, Marketing, Engineering Entrepreneurship, etc.	3

3. JUSTIFICATION AND STUDENT LEARNING OUTCOMES

The current curriculum offers the following five electives:

- One Math/Science elective,
- One Materials elective,
- Two Engineering Science electives, and
- One Industrial Engineering elective.

In the new proposed curriculum, we are deleting one elective (Materials) and adding five more electives. The list of electives then becomes:

- One Math/Science elective,
- Two Engineering Science electives,
- Two Industrial Engineering electives,
- One Engineering Management elective,
- One Computer Programming elective,
- One Professional Development elective, and
- One Approved elective.

Therefore, as opposed to a student taking 5 elective courses, they now have the opportunity to take 9 elective courses. This change enhances the ability for a student to develop a course of study to fit their specific interest and career goals. Our benchmark study of nine other industrial engineering (IE) programs revealed an average of 5.3 IE-specific elective hours with five of the nine peer IE programs providing additional elective options above these IE-specific hours ranging from 6 to 18 hours. The proposed change for our program adds five elective courses (12-hours) to the curriculum in the form of another *IE-course specific* elective, an *engineering management* elective (which is selected from two IE courses), a *computer programming* elective, a *professional development* elective, and an *approved* elective. This change results in a total of 9-hours of IE specific course electives and another 9-hours of electives for career development over what was previously available. This gives them a total of 27-hours of electives they can use to broaden their knowledge or develop more depth specific to IE.

Along the same line, we have proposed to expand the list of courses for both the *math/science elective* and *engineering science electives* to give students greater flexibility in defining what specific math/science course and engineering topics they would like to study.

Specific to our industrial engineering focused courses, a survey of our alumni revealed a need to enhance the programming skills of our graduates, elevate our project management course from an elective to a required course, and provide more class time to the concept of lean systems. This resulted in the following changes:

- We added a *computer programming elective* where students select from one of two introductory programming courses. Prior to this change, students were taught programming as one component of the course: IE 4934 – Information Systems for IE. Adding the programming elective course to the curriculum, allows us to reduce the content in this course permitting us to change the course to a 3-hour course (IE 4933).
- To accommodate adding project management to our curriculum, we considered removing IE 4513 – Engineering Administration and replacing it with our existing project management course (IE 4533). However, both courses are of important, so it was decided to require an *engineering management* elective and allow the student to choose one of the two courses: IE 4513 Engineering Administration or IE 4533 Project Management.
- To better address lean concepts, we are adding a new freshmen level course – IE 1313 Lean Work Systems. This will replace our current introductory course, IE 1911 Introduction to IE. This course will introduce students to the concepts of lean and work flow.
- IE 3121, Industrial Ergonomics Lab, will no longer be required. The lab was initially designed to provide students with hands-on experience with a variety of work measurement and ergonomics tools and techniques. However, with technology advances for many of the tools used, there is not a need to meet in a physical lab. Therefore, much of that content will move into the new IE 1313 course. Students will use the tools and techniques as a part of homework assignments and term projects.

To accommodate the new electives in the curriculum we needed to eliminate 6 hours of course work from the curriculum. Based on feedback from alumni, the engineering graphics course (EG 1142) and public speaking course (CO 1003) were removed. Alumni indicated they were not being called on to use the skills from EG 1142 and that they had received ample opportunity to learn and practice public speaking within the current curriculum. Students will begin learning about public speaking in the freshmen course IE 1313 as they make presentations concerning their class projects. In GE 3513, students are taught and required to practice public speaking. Students then are required to make presentations in several other classes within the curriculum as they progress, not limited to IE 3323, IE 4773, and IE 4914. Table 1 shows what other engineering departments are using for their oral communication requirement illustrating that our proposal is not out of line with other programs in the college. To provide an additional hour, we are reducing the course content of IE 4915 – Design of

Industrial Systems changing it from a 5-hour course to a 4-hour course (IE 4914 – Industrial Systems Design). Over the last several years, as this course has been refined, the instructor believes the current course does not warrant the 5-hour course credit.

Overall, these proposed changes will result in graduates that possess either a greater breath or depth of knowledge of engineering, making them more prepared to enter the workforce and be successful.

Table 1. Oral communication requirements for engineering degree programs

Department	Engineering Degree	Oral Communication Requirement
ASE	Aerospace Engineering	ASE 2013 Astrodynamics, Propulsion and Structures Either ASE 4513/ASE 4523 Aircraft Design VII or ASE 4533/ASE 4543 Spacecraft Design I/II ASE 4623 Aerospace Structural Design ASE 4721 Aerospace Engineering Laboratory II GE 351 3 Technical Writing
ABE	Biological Engineering	Satisfied by successful completion of GE 3513
	Biomedical Engineering	Satisfied by successful completion of GE 3513
CHE	Chemical Engineering	CHE 3222 Chemical Engineering Laboratory I CHE 3232 Chemical Engineering Laboratory II CHE 4134 Process Design CHE 4233 Chemical Plant Design
	Petroleum Engineering	PTE 3902 Petroleum Engineering Lab 1 PTE 3912 Petroleum Engineering Lab 2 PTE 4993 Petroleum Economic Analysis
CE	Civil Engineering	Fulfilled in GE 3513 and various CE courses
CSE	Computer Science	CO 1003 Fundamentals of Public Speaking or CO 1013 Introduction to Communication
	Software Engineering	CO 1003 Fundamentals of Public Speaking or CO 1013 Introduction to Communication
ECE	Computer Engineering	CO 1003 Fundamentals of Public Speaking or CO 1013 Introduction to Communication
	Electrical Engineering	CO 1003 Fundamentals of Public Speaking or CO 1013 Introduction to Communication
ISE	Industrial Engineering	Proposed: Fulfilled in GE 3513 and various IE courses
ME	Mechanical Engineering	ME 2133 Modeling and Manufacturing ME 4443 Mechanical Systems Design GE 3513 Technical Writing

Learning Outcomes

The department has adopted the seven new learning outcomes defined by the ABET accreditation board of our industrial engineering program. These outcomes are:

1. Students will be able to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Students will be able 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. Students will be able to communicate effectively with a range of audiences
4. Students will be able 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. Students will be able 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. Students will be able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Students will be able to acquire and apply new knowledge as needed, using appropriate learning strategies.

Questions

1. Will this program change meet local, state, regional, and national educational and cultural needs? If so, please describe.

   Based on our benchmark study of nine other peer IE programs, the proposed program is aligned and competitive with these programs. The proposed changes address the needs of our graduates as expressed in the results of our recent alumni survey. The proposed changes still meets the ABET requirements for accreditation.

2. Will this program change result in duplication in the System? If so, please describe.

   No. We are only creating one new freshmen-level course "Lean Works Systems" that addresses only industrial engineering topics.

3. Will this program change/advance student diversity within the discipline? If so, please describe.

   The changes have no direct impact on this area.

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.

   The changes will enhance a student's ability to gain either additional breadth or depth in the discipline. This will make the students more attractive to employers impacting both job placement (for all locations) and result in increased salaries (question 5 below).

5. Will this program change result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S.? If so, please describe.

   The changes will enhance a student's ability to gain either additional breadth or depth in the discipline. This will make the students more attractive to employers impacting both job placement (for all locations) and result in increased salaries.

4. SUPPORT

   See attached letters:

   - From each of the departments represented by new courses added to the list of electives for the curriculum.
   - For campus-6 approval
   - ISE faculty support of degree modification

5. PROPOSED 4-LETTER ABBREVIATION

   No change

6. EFFECTIVE DATE

   Fall 2020

New Proposed Industrial Engineering Courses

IE 1313 Lean Work Systems: 3 hour.
Three hours lecture. Provides an introduction to fundamental industrial engineering concepts and tools, including career exploration. Introduces theories and concepts related to lean work systems, along with techniques for system evaluation and improvement.

IE 4914 Industrial Systems Design: 4 hours.
(Prerequisites: Grade of C or better in the following courses: IE 3123, IE 3323, and IE 4333, and consent of instructor). Two hours lecture. Eight hours laboratory. The fundamental procedures and techniques in design operational systems

IE 4933 Information Systems in Industrial Engineering: 3 hours.
Three hours lecture. An introduction to the design and development of information systems for use in industrial engineering applications

Existing Industrial Engineering Courses

IE 1911 Introduction to Industrial Engineering: 1 hour.
Three hours laboratory. Concepts of industrial engineering, emphasizing the total systems approach. Introduction to analysis and design of general and industrial systems

IE 2990 Special Topics in Industrial Engineering: 1-9 hours.
Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

IE 3121 Industrial Ergonomics Laboratory: 1 hour.
(Undergraduate Students co-requisites: IE 4613 and IE 3123; Graduate Students co-requisite: IE 4613/6613). Three hours laboratory. Application of human factors/ergonomics concepts in structured assignments involving data collection, analysis, and report generation. Hands-on experience with sophisticated testing equipment

IE 3123 Industrial Ergonomics: 3 hours.
(Undergraduate Students co-requisites: IE 4613 and IE 3121; Graduate Student co-requisite: IE 4613/6613). Three hours lecture. Analysis of work tasks; ergonomic design principles for manual work design, workplace design, and work environment design; work measurements; and design of wage payment plans

IE 3323 Manufacturing Processes: 3 hours.
(Co-requisites: IE 3913 and CHE 3413 or ME 3403). Two hours lecture. Three hours laboratory. Manufacturing processes and materials; interrelationship of product design, material properties, and processing methods; robotics and CAM systems; economic factors in material, process, and equipment selection

IE 3913 Engineering Economy I: 3 hours.
(Prerequisite: MA 1713). Three hours lecture. Principles of evaluating alternative engineering proposals. Economic measures of effectiveness, costs and cost estimates, basic comparative models, break even and replacement analysis

IE 4000 Directed Individual Study in Industrial and Systems Engineering: 1-6 hours.
Hours and credits to be arranged

IE 4113 Human Factors Engineering: 3 hours.
(Prerequisite: Junior standing in engineering). Two hours lecture. Three hours laboratory. Human capabilities and limitations affecting communications and responses in man-machine systems. Emphasis on physiological and psychological fundamentals

IE 4123 Psychology of Human-Computer Interaction: 3 hours.
(Prerequisite: PSY 3713 or CS 4663/6663 or IE 4113/6113 or consent of instructor). Two hours lecture. Two hours laboratory. Exploration of psychological factors that interact with computer interface usability. Interface design techniques and usability evaluation methods are emphasized. (Same as CS 4673/6673 and PSY 4743/6743)

IE 4173 Occupational Safety Engineering: 3 hours.
(Prerequisite: Junior standing). Three hours lecture. Causes and prevention of industrial accidents. Analysis of hazardous processes and materials. Design of occupational safety systems and programs

IE 4193 Automotive Engineering: 3 hours.
Three hours lecture. Fundamentals of automotive engineering including power units, mechanical systems, electrical systems and industrial and systems engineering aspects. (Same as CHE/ECE/ME 4193/6193)

IE 4333 Production Control Systems I: 3 hours.
(Prerequisite: Grade of C or better in IE 4613). Three hours lecture. Principles, analysis, and design of production and inventory planning and control. Demand for forecasting, aggregated planning, inventory management , production scheduling and control systems

IE 4353 Materials Handling: 3 hours.
(Prerequisite: Junior or Senior Standing). Three hour lecture. Analysis and design of materials handling systems and components. Introduction to facilities design

IE 4373 Automation: 3 hours.
Two hours lecture. Three hours laboratory. Introduction to the various technologies used in both design and manufacturing automation

IE 4513 Engineering Administration: 3 hours.
(Prerequisite: Junior or graduate standing in engineering). Three hours lecture. Study of problems confronting the engineering manager. Includes: Organization and communication theory, internal and external relationships and responsibilities, and designing and implementing managerial systems

IE 4533 Project Management: 3 hours.
(Prerequisites: Grade of C or better in IE 4613). Three hours lecture. Use of CPM, PERT, and GERT for planning, managing and controlling projects. Computer procedures for complex networks

IE 4543 Logistics Engineering: 3 hours.
(Prerequisite: IE 4613 and senior or graduate standing, Co-requisites: IE 4733 or MA 4733). Three hours lecture. Analysis of complex logistics networks. Integration of supply, production, inventory, transportation, and distribution. Strategies for reducing logistics costs and lead times. Customer-supplier partnerships

IE 4553 Engineering Law and Ethics: 3 hours.
(Prerequisite: Senior standing in engineering). Three hours lecture. The engineer and his relations to the law, to the public, and the ethics of his profession. Includes contracts, patents, copyrights, sales agreements, engineering specifications

IE 4573 Process Improvement Engineering: 3 hours.
Three hours lecture. Introduction to quality and productivity improvement methodologies and tools. The design and implementation of continuous improvement systems in organizations

IE 4613 Engineering Statistics I: 3 hours.
(Prerequisite: MA 1723). Three hours lecture. Introduction to statistical analysis. Topics include: probability, probability distributions, data analysis, parameter estimation, statistical intervals, and statistical inferences

IE 4623 Engineering Statistics II: 3 hours.
(Prerequisite: Grade of C or better in IE 4613). Three hours lecture. Continuation of IE 4613/6613. Introduction to engineering applications of regression, experimental design and analysis, and nonparametric methods

IE 4653 Industrial Quality Control: 3 hours.
(Prerequisite: IE 4613). Three hours lecture. The theory and application of statistical quality control; statistical process control; and statistical acceptance sampling

IE 4673 Reliability Engineering: 3 hours.
(Prerequisites: IE 4613). Three hours lecture. Probability functions and statistical methods for component life testing and system reliability prediction. System availability and maintainability. Redundancy in time-dependent and time-independent situations

IE 4713 Operations Research I: 3 hours.
(Prerequisites: IE 4613). Mathematical techniques of decision making, queuing, networks, simulation and dynamic programming

IE 4733 Linear Programming: 3 hours.
(Prerequisites: MA 3113).Three hours lecture.Theory and application of linear programming;simplex algorithm, revised simplex algorithm,duality and sensitivity analysis,transportation and assignment problems algorithms, integer and goal programming. (Same as MA 4733/6733)

IE 4743 Engineering Design Optimization: 3 hours.
(Prerequisite: Consent of instructor). Three hours lecture. Introduction to optimality criteria and optimization techniques for solving constrained or unconstrained optimization problems. Sensitivity analysis and approximation. Computer application in optimization. Introduction to MDO. (Same as ASE 4553/6553 and EM 4143/6143)

IE 4753 Systems Engineering and Analysis: 3 hours.
(Prerequisite: Grade of C or better in IE 3913 and IE 4613). Three hours lecture. Systems concepts, methodologies, models and tools for analyzing, designing, and improving new and existing human-made systems

IE 4773 Systems Simulation I: 3 hours.

(Prerequisite: Grade of C or better in IE 4934 or equivalent programming course, Co-requisite: IE 4623). Three hours lecture. The principles of simulating stochastic systems with an emphasis on the statistics of simulation and the use of discrete-event simulation languages

IE 4915 Design of Industrial Systems: 5 hours.

(Prerequisites: Grade of C or better in the following courses: IE 3123, IE 3121, IE 3323, and IE 4333, and consent of instructor). Two hours lecture. Eight hours laboratory. The fundamental procedures and techniques in design operational systems

IE 4923 Six Sigma Methods and Project: 3 hours.

(Prerequisites: IE 4623/6623, IE 4653/6653) One hour lecture Four hours laboratory. Introduction of six sigma and problem solving methodologies. Application of learned methodologies in selecting, performing, and completing a process involvement project

IE 4934 Information Systems for Industrial Engineering: 4 hours.

Three hours lecture. Three hours laboratory. An introduction to the design and development of information systems for use in industrial engineering applications

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY
COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 18, 2019

To: Judith L. Bonner, Ph.D.
Provost and Executive Vice President

From: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

Re: Support for IE program curriculum change.

Mississippi State University performed a market analysis in 2013 that showed a demand for engineering degrees on the Mississippi Gulf Coast. MSU President Dr. Mark Keenum obtained written permission from Dr. Rodney Bennett of the University of Southern Mississippi to allow MSU to teach engineering curricula. To date, two programs have been developed: Mechanical Engineering and Electrical Engineering. The MSU Gulf Coast Campus is co-located on the Jackson County Campus of Mississippi Gulf Coast Community College. There are currently over 100 total students enrolled in the program and to date there are about 10 total graduates of the programs.

Through the generous support of the Hearin Foundation, the university has secured resources to initiate a third degree program on the coast: Industrial Engineering. The attached proposal details a modification to the IE BS degree program for Campus 1, which is also proposed to be offered for Campus 6, as well. This proposal is supported by the faculty of the department and the college administration.

Approved:

Jason M. Keith, Ph.D.
Dean, Bagley College of Engineering

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 18, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Jonathan Pote, Ph.D.
Professor and Head of Agricultural and Biological Engineering

Re: Support for IE program curriculum change.

The Department of Agricultural and Biological Engineering approves the change in the IE program expanding the list of engineering science electives to include the following three courses:

ABE 3413 Bioinstrumentation
ABE 3513 GPS & GIS in Ag. and Eng.
ABE 4613 Biomechanics

X
Jonathan Pote, Ph.D.

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

Date: March 21, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Angus Dawe, Ph.D.
Department Head & Dr. Donald L. Hall Distinguished Professor of Biology

The Department of Biological Sciences supports and approves the proposed curriculum change in the IE program to expand the list of courses available to students for their Math/Science elective with the inclusion of BIO 1134 (Biology I). We offer this course every semester and will be pleased to accommodate any IE students that wish to take it.

Digitally signed by Angus Dawe
DN: cn=Angus Dawe, o=Mississippi State University, ou=Biological Sciences, email=dawe@biology.msstate.edu, c=US
Date: 2019.03.20 12:43:40 -05'00'

MISSISSIPPI STATE UNIVERSITY™
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Dr. Dennis D. Truax, P.E., BCEE, F.ASCE, F.NSPE
James T. White Endowed Chair, Department Head and Professor
662.325.7187; truax@cee.msstate.edu

Memorandum

To: Dr. John M. Usher, P.E.
Professor and Head
Industrial and System Engineering

From: Dr. Dennis D. Truax, P.E., DEE, D.WRE, F.ASCE, F.NSPE
Department Head, James T. White Endowed Chair, and Professor

Date: March 15, 2019

Subject: Request for Support for IE program curriculum change

I have reviewed the currently proposed Industrial Engineering program modifications. It appears that, if there were to be an impact our course offerings, it would be the result of expanding the list of approved engineering science electives to include the following course offered by our program:

- CE 2803 Environmental Engineering
- CE 3113 Transportation Engineering
- CE 3603 Structural Mechanics

At this time, these course are being offered twice per year and, while annual enrollment if larger, section enrollment would appear to have the capacity to accommodate additional students. Further, it is reasonable that the students can arrange their program of study to ensure they meet the prerequisites for these classes in a timely manner.

Therefore, in conclusion, I am writing to document that we approve the inclusion of the above classes in the proposed Industrial Engineering curriculum changes.

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 13, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Bill Elmore, Ph.D.
Associate Professor and Director of Chemical Engineering

Re: Support for IE program curriculum change.

The Department of Chemical Engineering approves the change in the IE program expanding the list of engineering science electives to include the following three courses:

CHE 2213 Chemical Eng. Analysis
CHE 3113 Chemical Eng. Thermodyn.
CHE 3413 Engineering Materials

X Bill B. Elmore

Digitally signed by Bill B. Elmore
DN: cn=Bill B. Elmore, o=Mississippi State University, ou=Swalm School of Chemical Engineering, email=elmore@che.msstate.edu, c=US
Date: 2019.03.12 18:56:51 -05'00'

Bill Elmore, Ph.D.

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 15, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Dennis W. Smith, Jr., Ph.D.
Professor and Head of Chemistry

Re: Support for IE program curriculum change.

The Department of Chemistry approves the change in the IE program involving the expansion of the list of courses for their Math/Science Electives to include the course: CH 2313 Analytical Chemistry

X Dennis Smith Digitally signed by Dennis Smith Date: 2019.03.20 07:59:23 -05'00'

Dennis W. Smith, Jr., Ph.D.

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 12, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Shahram Rahimi, Ph.D.
Professor and Head of Computer Science and Engineering

Re: Support for IE program curriculum change.

The Department of Computer Science and Engineering approves the change in the IE program requiring the inclusion of a required computer programming elective that will be fulfilled by students taking either CSE 1233 Computer Programming with C or CSE 1284 Intro to Computer Programming, subject to the prerequisites stated in the undergraduate catalog.

X Shahram Rahimi

Digitally signed by Shahram Rahimi
Date: 2019.03.18 09:16:33 -05'00'

Shahram Rahimi, Ph.D.

MISSISSIPPI STATE UNIVERSITY™
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

Nicolas H. Younan
Department Head and Professor
James Worth Bagley Chair
younan@ece.msstate.edu

Date: March 11, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Nicolas Younan, Ph.D.
Professor and Head of Electrical and Computer Engineering

Re: Support for IE program curriculum change.

The Department of Electrical and Computer Engineering approves the change in the IE program expanding the list of engineering science electives to include both ECE 3413 - Introduction to Electronic Circuits and ECE 4423 – Introduction to Remote Sensing Technologies (cross listed as ABE 4483). ECE 3413 is currently required, but is being moved to the list of engineering science electives.

Sincerely yours,

Nicolas Younan

Nicolas H. Younan, Ph.D.
Department Head and Professor
James Worth Bagley Chair

MISSISSIPPI STATE
UNIVERSITY

Department of Geosciences
108 Hilburn Hall
355 Lee Blvd.
P.O. Box 5448
Mississippi State, MS 39762
Phone (662) 325-3915
FAX (662) 325-9423

March 18, 2019

Dear Curriculum Committee Chair,

The Department of Geosciences Curriculum Committee has reviewed the proposed degree changes within the Industrial Engineering program, specifically the expansion of the math and science requirements to include two of our courses. **We fully support the proposal** and agree to have GG 4153 Engineering Geology and GG 4233 Applied Geophysics added to your curriculum. We are excited about the future interactions between our departments. If you have any questions or need additional information, please let us know.

Respectfully,

Andrew Mercer (Committee Chair)

Barrett Gutter (Committee Member)

Rinat Gabitov (Committee Member)

Shrinidhi Ambinakudige (Committee Member)

Cc: Dr. John C. Rodgers, Head, Department of Geosciences

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 18, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Mohsen Razzaghi, Ph.D.
Professor and Head of Mathematics and Statistics

Re: Support for IE program curriculum change.

The Department of Mathematics and Statistics approves the change in the IE program involving the expansion of the list of courses for their Math/Science Electives to include the following additional courses:

- MA 3053 Foundation of Math I
- MA 4143 Graph Theory
- MA 4313 Numerical Analysis I
- MA 4533 Probabilistic Random Process
- ST 4213 Nonparametric Methods

X Mohsen Razzaghi

Digitally signed by Mohsen Razzaghi
DN: cn=Mohsen Razzaghi, o=Mississippi State University, ou=Mathematics and Statistics, email=rrazzaghi@math.msstate.edu, c=US
Date: 2019.03.11 16:22:57 -05'00'

Mohsen Razzaghi, Ph.D.

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 19, 2019

To: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering

From: Pedro Mago, Ph.D.
Professor and Head of Mechanical Engineering

Re: Support for IE program curriculum change.

The Department of Mechanical Engineering approves the change in the IE program expanding the list of engineering science electives to include the following two courses:

ME 3113 Engineering Analysis
ME 3403 Materials for ME Design

X Pedro Mago

Pedro Mago, Ph.D.

MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY COLLEGE OF ENGINEERING

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING

Dr. John M. Usher, P.E.
Department Head and Professor
usher@ise.msstate.edu

Date: March 21, 2019

To: Dr. Dana Pomykal Franz, Chair
University Committee on Courses and Curricula (UCCC)

From: John M. Usher, Ph.D., P.E.
Professor and Head of Industrial and Systems Engineering (ISE)

Re: Faculty support for the industrial engineering BS program curriculum change.

The signatures below document the support of the faculty within the Department of Industrial and Systems Engineering for the proposed changes in the curriculum of the industrial engineering BS program.

Name	For Program Changes	Against Program Changes
Linkan Bian		
Stan Bullington		
Reuben Burch		
Raed Jaradat		
Junfeng Ma		
Mohammad Marufuzzaman		
Brian Smith		
Lesley Strawderman		
Wenmeng Tian		
John M. Usher		