MICHIGAN STATE UNIVERSITY

Report of

THE UNIVERSITY COMMITTEE ON CURRICULUM

to the Faculty Senate

September 12, 2023

The effective date for new programs subject to Statewide Academic Program review is implemented in accordance with the Statewide Academic Program Review calendar.

MICHIGAN STATE UNIVERSITY
University Committee on Curriculum

September 12, 2023

TO: Faculty Senate

This report is prepared and distributed for the following purposes:

1. To report new academic programs, changes in academic programs, discontinuations of academic programs, new courses, permanent changes in courses, and deletions of courses.
2. To notify the initiating colleges, schools, and departments of approval by the University Committee on Curriculum of their requests for new academic programs, changes in academic programs, discontinuations of academic programs, new courses, permanent changes in courses, and deletions of courses. Any items not approved by the Faculty Senate will be reported to the appropriate college and department or school.
3. To provide information to members of the faculty in each department about academic programs and courses in all colleges, departments, and schools of the University.

Reports of the University Committee on Curriculum to the Faculty Senate are organized as follows:

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES:

Organized by colleges in alphabetical order. For a given college, academic units are organized in alphabetical order. For a given academic unit, degrees, majors, and specializations are organized in alphabetical order.

PART II - NEW COURSES:[1]

Organized by academic units in alphabetical order; All-University courses appear last. For a given academic unit, courses are organized according to the names associated with course subject codes, in alphabetical order. Courses with the same subject code are in numerical order.

PART III - COURSE CHANGES:[1]

Organized by academic units in alphabetical order; All-University courses appear last. For a given academic unit, courses are organized according to the names associated with course subject codes, in alphabetical order. Courses with the same subject code are in numerical order.

Not all of the above categories, and not all of the colleges and academic units, will necessarily appear in any given Senate Report.

[1]One or more of the abbreviations that follow may be included in a course entry:

P:	=	Prerequisite monitored in SIS
C:	=	Corequisite
R:	=	Restriction
RB:	=	Recommended background
SA:	=	Semester Alias

MICHIGAN STATE UNIVERSITY

September 12, 2023

TO: Faculty Senate

FROM: University Committee on Curriculum

SUBJECT: New Academic Programs and Program Changes:
New Courses and Course Changes

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Delete the curriculum and degree requirements for the **Minor** in **Forestry Field Applications** in the Department of Forestry. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request at its March 23, 2023 meeting. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Graduate Studies.

   No new students are to be admitted to the program effective Fall 2023. No students are to be readmitted to the program effective Fall 2023. Effective Fall 2024, coding for the program will be discontinued and the program will no longer be available in the Department of Forestry. Students who have not met the requirements for the Minor in Forestry Field Applications through the Department of Forestry prior to Fall 2024 will have to change their minor.

2. Delete the curriculum and degree requirements for the **Agricultural Technology Certificate** in **Horse Management** in the Institute of Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request at its April 6, 2023 meeting. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

   No new students are to be admitted to the program effective Spring 2023. No students are to be readmitted to the program effective Spring 2023. Effective Fall 2023, coding for the program will be discontinued and the program will no longer be available in the Institute of Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate in Horse Management through the Institute of Agricultural Technology prior to Fall 2023 will have to change their certificate.

3. Change the requirements for the **Agricultural Technology Certificate** in **Livestock Industries** in the Institute of Agricultural Technology.

   a. Under the heading **Requirements for Livestock Industries** make the following changes:

      (1) Add the following:

      Students must complete 48 credits from the following:

      (2) In item 1., delete the following courses:

ABM	130	Farm Management I	3
ANS	110	Introductory Animal Agriculture	4

      Add the following courses:

AFRE	130	Farm Management I	3
ANS	110	Introductory Animal Agriculture	3
ANS	110L	Introductory Animal Agriculture Laboratory	1

      (3) In item 3., delete the following course:

ANS	232	Introductory Dairy Cattle Management	3

Add the following course:

ANS	134	Dairy Production I	3

(4) In item 4., change the credits required from ‘12’ to ’12 or 13’.

(5) Delete the following notes:

Students who do not demonstrate English proficiency through the IAT-administered Accuplacer placement test or college-level transfer credit must complete AT 045 Agricultural Communications (2 credits) or an equivalent course as approved by the program coordinator.

Students who do not demonstrate math proficiency through the IAT-administered Accuplacer placement test or college-level transfer credit must complete AT 071 Technical Mathematics (2 credits) as approved by the program coordinator.

Effective Summer 2023.

ELI BROAD COLLEGE OF BUSINESS

1. Establish a **Graduate Certificate** in **Healthcare Compliance** in the Eli Broad College of Business and Graduate School of Management. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its February 20, 2023 meeting.

a. **Background Information**:

The Graduate Certificate in Healthcare Compliance will provide post—baccalaureate credentials and career development for students seeking to improve their academic profile or employment qualifications. The certificate is aimed at professional and graduate students interested in advancing their careers in the health care compliance arena. This graduate program was previously a part of the Master of Science Degree in Healthcare Management as a concentration. To be more competitive and provide a greater reach to the community, the Healthcare Compliance concentration is being moved to a graduate certificate program.

b. **Academic Programs Catalog Text**:

The Graduate Certificate in Healthcare Compliance is designed to provide career development for professionals seeking to advance their career in the healthcare compliance arena. The program is targeted at students interested in applying to graduate or professional school and individuals working in healthcare industry. The certificate is available only online.

Admission

To be admitted to the Graduate Certificate in Healthcare Compliance, a student must:

1. have a minimum cumulative undergraduate grade-point average of 2.5 or a graduate grade-point average of 3.0. Grade-point average is not indicative of student success in the graduate certificate.
2. be currently employed in the healthcare industry.
3. provide a personal statement.

The applicant’s overall record is considered. Students are educated during the recruitment process regarding the pace of the program, and length of time to complete the graduate certificate. Non-qualified students will be assisted with identifying alternate program options, if needed.

Requirements for the Graduate Certificate in Healthcare Compliance

				CREDITS
Students must complete a minimum of 10 credits from the following:				
1.	All of the following courses (8 credits):			
	HCM	821	Healthcare Regulations	2
	HCM	822	Healthcare Compliance	2
	HCM	823	Enterprise Risk Management	2
	HCM	824	Implementing Compliance Systems	2
2.	At least 2 credits from the following courses:			
	HCM	801	Critical Thinking and Innovation in Healthcare	2
	HCM	807	Law and Ethics in Healthcare	2
	HCM	809	Organizational Behavior in Healthcare	2

Effective Fall 2023.

2. Establish a **Graduate Certificate** in **Healthcare Leadership** in the Eli Broad College of Business and Graduate School of Management. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its February 20, 2023 meeting.

a. **Background Information**:

The Graduate Certificate in Healthcare Leadership will provide post—baccalaureate credentials and career development for students seeking to improve their academic profile or employment qualifications. The certificate is aimed at professional and graduate students interested in advancing their careers in the healthcare leadership arena. This graduate program was previously a part of the Master of Science Degree in Healthcare Management as a concentration. To be more competitive and provide a greater reach to the community, the Healthcare Leadership concentration is being moved to a graduate certificate program.

b. **Academic Programs Catalog Text**:

The Graduate Certificate in Healthcare Leadership is designed to provide career development for professionals seeking to advance their career in the healthcare leadership arena. The program is targeted at students interested in applying to graduate or professional school and individuals working in the healthcare industry. The certificate is available only online.

Admission

To be admitted to the Graduate Certificate in Healthcare Leadership, a student must:

1. have a minimum cumulative undergraduate grade-point average of 2.5 or a graduate grade-point average of 3.0. Grade-point average is not indicative of student success in the graduate certificate.
2. be currently employed in the healthcare industry.
3. provide a personal statement.

The applicant's overall record is considered. Students are educated during the recruitment process regarding the pace of the program, and length of time to complete the graduate certificate. Non-qualified students will be assisted with identifying alternate program options, if needed.

Requirements for the Graduate Certificate in Healthcare Leadership

				CREDITS
Students must complete a minimum of 10 credits from the following:				
1.	All of the following courses (8 credits):			
	HCM	817	Healthcare Leadership	2
	HCM	818	Strategic Decision Making	2
	HCM	819	Market Analysis and Planning	2
	HCM	820	Negotiations	2

2. At least 2 credits from the following courses:

HCM	801	Critical Thinking and Innovation in Healthcare	2
HCM	807	Law and Ethics in Healthcare	2
HCM	809	Organizational Behavior in Healthcare	2

Effective Fall 2023.

3. Establish a **Graduate Certificate** in **Elements of Global Supply Chain Management** in the Department of Supply Chain Management. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its February 20, 2023 meeting.

a. **Background Information**:

While Broad has the #1 Supply Chain Management designation, we do not have sufficiently inclusive programs to help MSU's many stakeholders. At present we have a highly sought after undergraduate program, and a master's program for students already in their careers. The proposed certificate is intended to fill the gap between our 4-year Bachelor of Arts and the Master of Science programs.

In relation to market research, there is a need for a basic supply chain education at the graduate level. Such a program would need to be accomplished in a year and be completed exclusively online. To preserve the reputation of the two existing degree programs (bachelor's and master's degrees) the graduate certificate allows education for individuals who do not have a business background in either academics or work experience to obtain experience in the supply chain field. For example, this program would be ideal for individuals with an undergraduate degree who work at a family-owned business, as well as individuals who do not have a business background who wish to strengthen their credentials for the job market.

b. **Academic Programs Catalog Text**:

The Graduate Certificate in Elements of Global Supply Chain Management is designed to provide a basic supply chain and business education for those entering the industry or looking to make a career change. The certificate is targeted at students new to the supply chain field who are missing the academic credentials to advance in their careers. The certificate is available only online.

Admission

To be admitted to the Graduate Certificate in Elements of Global Supply Chain Management, a student must:

1. have a minimum undergraduate grade-point average of 2.5.

The applicant's overall record is considered. Work experience or internships that generated exposure to supply chain concepts will be considered. Students are educated during the recruitment process regarding the pace of the program, and length of time to complete the graduate certificate.

Requirements for the Graduate Certificate in Elements of Global Supply Chain Management

Students must complete 11 credits from the following:
All of the following courses (11 credits):

			CREDITS
SCM	801	Introduction to Global Business and Supply Chain	2
SCM	803	Introduction to Supply Chain Analytics	3
SCM	805	Basic Elements of Strategic Sourcing	2
SCM	806	Basic Elements of Logistics and Warehousing	2
SCM	807	Basic Elements of Operations Management	2

Effective Fall 2023.

COLLEGE OF COMMUNICATION ARTS AND SCIENCES

1. Change the requirements for the **Master of Arts** degree in **Health and Risk Communication** in the College of Communication Arts and Sciences. The University Committee on Graduate Studies (UCGS) approved this request at its April 17, 2023 meeting.

   a. Under the heading **Requirements for the Master of Arts Degree in Health and Risk Communication** in item 3., add the following course:

JRN	872	Environment, Science and Health Reporting Topics	3

   Effective Fall 2023.

COLLEGE OF EDUCATION

1. Establish a **Doctor of Education** degree in **Leadership for Equity Minded Change in Postsecondary Education** in the Department of Educational Administration. The University Committee on Graduate Education (UCGS) recommended approval of this request at its February 20, 2023 meeting.

   a. **Background Information**:

   Beginning in 2018, the Higher, Adult and Lifelong Education (HALE) faculty began to review it's doctoral program and determined that to best suit the needs of our students we needed to add an Ed.D. program that would focus more intentionally on research for practice. The Department of Educational Administration at Michigan State University (MSU) prepares leaders to meet the needs of learners and make an impact across a wide range of settings.

   As our graduate programs consistently rank within the top ten in the nation, we continue to attract a diverse community of learners with a wide range of scholarly and professional interests. Many students within the Higher, Adult, and Lifelong Education (HALE) Ph.D. program often pursue faculty positions upon graduation. Yet a growing number of these learners seek roles as administrators, entering the HALE Ph.D. program to advance their careers and become scholar-practitioners. To better serve students with these administrative aspirations, the HALE unit within the Department of Educational Administration proposes a new degree program—Leadership for Equity Minded Change in Postsecondary Education. The purpose of this degree is to train scholar-practitioners from a variety of postsecondary settings to become equity-focused, inquiry driven leaders. The rationale for this program is three-fold. First, postsecondary education is more complex today than in the past. Changing demographics and the imperatives of racial justice and equitable inclusion, both nationally and globally, present new and complex challenges for leaders. Second, various sectors, including higher education, grapple with the effects of deeply entrenched biases and prejudices that make for hostile work and educational spaces. Ample evidence shows that various groups experience organizations in radically different ways and for leaders to take responsibility for creating more inclusive and equity committed spaces. Third, organizational leaders often report that they are ill-equipped to address how their organization is a racialized, gendered, and classed space. Thus, even when formal (and informal) leaders believe in and want to implement a more just and equity-focused organization, they lack the tools, language, or background to do so.

   The mission of the Doctor of Education degree in Leadership for Equity Minded Change in Postsecondary Education is to provide learners with a breadth of cutting-edge field knowledge and the skills necessary to lead with an analytical and equity-focused approach. Leadership inquiry is an analytical approach to leadership that uses scholarship to advance policy and practice as well as transform educational systems to become inclusive, equitable, and sustainable communities that serve locally, nationally, and globally. With an emphasis on equity, students will learn how to design and implement effective organizational learning and improvement practices to steer equity-minded change. Pursuant to this goal, the Ed.D. in Leadership for Equity Minded Change equips higher education and adult learning leaders to identify, understand, and solve complex problems through practice-relevant analysis. Learners will have the opportunity to focus their studies and educational experiences on specific institutional types, such as research-intensive institutions, community colleges, or private four-year institutions.

b. **Academic Programs Catalog Text**:

The Doctor of Education degree in Leadership for Equity Minded Change in Postsecondary Education provides learners with a breadth of cutting-edge field knowledge and the skills necessary to lead with an analytical and equity-focused approach. Leadership inquiry is an analytical approach to leadership that uses scholarship to advance policy and practice as well as transform educational systems to become inclusive, equitable, and sustainable communities that serve locally, nationally, and globally. With an emphasis on equity, students will learn how to design and implement effective organizational learning and improvement practices to steer equity-minded change.

The program consists of 45 credits of graduate study beyond the master's degree. In addition to meeting the requirements of the College of Education, students must meet the requirements specified below.

Admission

Applicants to the Doctor of Education degree in Leadership for Equity Minded Change in Postsecondary Education should:

1. submit official college transcripts from each degree-granting institution.
2. submit a personal statement that addresses interest in the program, including any personal and professional goals, and the qualities, characteristics, and skills that make the applicant a strong candidate.
3. submit three letters of recommendation from persons who are acquainted with the applicant's academic and professional experience, performance, and potential.
4. Submit a professional statement that demonstrates previous accomplishments and commitment to equity-minded change.

Requirements for the Doctor of Education in Leadership for Equity Minded Change in Postsecondary Education

Students must complete 45 credits from the following:

			CREDITS
1.	All of the following core courses (27 credits):		
	EAD 935	Foundations for Equity-Minded Leaders in Postsecondary Education	3
	EAD 960	Proseminar in Postsecondary Education	3
	EAD 964	Comparative Higher Education	3
	EAD 965	Diversity and Equity in Higher Education	3
	EAD 966	Students in Postsecondary Education	3
	EAD 967	Policy Development and Analysis in Postsecondary Education	3
	EAD 968	Teaching, Learning, and Curriculum in Postsecondary Education	3
	EAD 970	Organization and Governance in Postsecondary Education	3
	EAD 976	Budget and Finance for Equity in Postsecondary Education	3
2.	All of the following research courses (18 credits):		
	EAD 937A	Equity-Oriented Inquiry for Leaders 1	3
	EAD 937B	Equity-Oriented Inquiry for Leaders 2	3
	EAD 996A	Research Preparation 1	1
	EAD 996B	Research Preparation 2	1
	EAD 996C	Research Preparation 3	1
	EAD 996D	Research Preparation 4	1
	EAD 998A	Dissertation in Practice 1	4
	EAD 998B	Dissertation in Practice 2	4
3.	Completion of the comprehensive examination portfolio.		

Effective Summer 2024.

COLLEGE OF ENGINEERING

1. Change the requirements in the **Bachelor of Science** degree in **Computer Science** in the Department of Computer Science and Engineering.

   a. Under the heading **Requirements for the Bachelor of Science Degree in Computer Science** make the following changes:

      (1) In item 3. b. change the total credits from '32' to '35' and add the following course:

CSE	425	Introduction to Computer Security	3

      (2) In item 3. c. delete the following course:

CSE	425	Introduction to Computer Security	3

      Add the following course:

CSE	434	Autonomous Vehicles	3

      (3) In item 3. d. change the total credits from '15' to '12'.

      (4) In item 3. d., replace items (1) and (2) with the following:

      (1) A minimum of four courses totaling 12 or more credits. At least 6 of the 12 credits must be in courses at the 300-400 level.
      (2) Cognate in The Eli Broad College of Business consisting of this specific set of courses: ACC 230, FI 320, GBL 323 and MKT 327.
      (3) A sequence of at least three courses in a foreign language totaling at least 12 credits.

   Effective Fall 2023.

2. Change the requirements in the **Bachelor of Science** degree in **Civil Engineering** in the Department of Civil and Environmental Engineering.

   a. Under the heading **Requirements for the Bachelor of Science Degree in Civil Engineering** make the following changes:

      (1) In item 3. e. **Pavements** delete the following course:

CE	431	Pavement Design and Analysis	3

      Add the following course:

CE	431	Design and Analysis for New and Rehabilitated Pavements	4

   Effective Fall 2023.

COLLEGE OF MUSIC

1. Change the **General Requirements for All of the Bachelor's Degree Programs in the College of Music**.

   a. Under the heading **General Requirements for All of the Bachelor's Degree Programs in the College of Music** make the following changes:

      (1) In item 1., change the total credits from '24' to '21'.

      (2) In item 1., delete the following courses:

MUS	211	History of Western Music to 1750	3
MUS	212	History of Western Music Since 1750	3

Add the following course:

MUS	214	Introduction to Music Studies	3

Effective Fall 2023.

2. Change the requirements for the **Bachelor of Arts** degree in **Music** in the College of Music.

   a. Under the heading **Requirements for the Bachelor of Arts Degree in Music** make the following changes:

      (1) In item 3. a. (2), replace the first paragraph with the following:

Submit a body of work or portfolio that can be presented to the public. The body of work could include a paper, composition, film, sound art installation, album, or any other product that is satisfactory to the student's Capstone Experience Committee. The topic of the paper must be officially approved by the student's Capstone Experience Committee.

      (2) Add the following item 3. g.:

One of the following courses not used to satisfy 3. f. (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music (Section: Music and Religion in World Cultures)	2
MUS	491	Special Topics in Music (Section: Indigenous Music and Globalization)	2

Effective Fall 2023.

3. Change the requirements for the **Bachelor of Music** degree in **Music Education** in the College of Music. The Teacher Education Council (TEC) approved this request at its April 10, 2023 meeting.

a. Under the heading **Requirements for the Bachelor of Music Degree in Music Education** make the following changes:

(1) In item 3. d., delete the following course:

MUS	441	Introduction to Computer Music	3

Add the following course:

MUS	441	Advanced Fixed Media Composition	2

(2) In item 3. k., delete the following course:

MUS	456	Teaching Stringed Instruments	3

(3) In item 3. m., delete the following course:

MUS	456	Teaching Stringed Instruments	3

(4) Add the following item 3. n.:

One of the following courses not used to satisfy 3. e. (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music (Section: Music and Religion in World Cultures)	2
MUS	491	Special Topics in Music (Section: Indigenous Music and Globalization)	2

Effective Fall 2023.

4. Change the requirements for the **Bachelor of Music** degree in **Music Performance** in the College of Music.

a. Under the heading **Requirements for the Bachelor of Music Degree in Music Performance** make the following changes:

(1) In item 3. d. (1) make the following changes:

(a) Reletter item (d) to item (e) and add the following new item (d):

One of the following courses not used to satisfy 3. d. (1) (c) (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2

MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music	2
		(Section: Music and Religion in World Cultures)	
MUS	491	Special Topics in Music	2
(Section: Indigenous Music and Globalization)			

(2) In item 3. d. (2) make the following changes:

(a) Reletter item (f) to item (g) and add the following new item (f):

One of the following courses not used to satisfy 3. d. (2) (e) (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music	2
		(Section: Music and Religion in World Cultures)	
MUS	491	Special Topics in Music	2
(Section: Indigenous Music and Globalization)			

(3) In item 3. d. (3) make the following changes:

(a) Reletter item (f) to item (g) and add the following new item (f):

One of the following courses not used to satisfy 3. d. (3) (e) (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music	2
		(Section: Music and Religion in World Cultures)	
MUS	491	Special Topics in Music	2
(Section: Indigenous Music and Globalization)			

(4) In item 3. d. (4) make the following changes:

(a) Reletter item (f) to item (g) and add the following new item (f):

One of the following courses not used to satisfy 3. d. (4) (e) (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2

MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music	2
		(Section: Music and Religion in World Cultures)	
MUS	491	Special Topics in Music	2
(Section: Indigenous Music and Globalization)			

(5) In item 3. d. (5) make the following changes:

(a) Add the following new item (i):

One of the following courses not used to satisfy 3. d. (5) (h) (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music	2
		(Section: Music and Religion in World Cultures)	
MUS	491	Special Topics in Music	2
(Section: Indigenous Music and Globalization)			

Effective Fall 2023.

5. Change the requirements for the **Bachelor of Music** degree in **Composition** in the College of Music.

a. Under the heading **Requirements for the Bachelor of Music Degree in Composition** make the following changes:

(1) Add the following item 3. i.:

One of the following courses not used to satisfy 3. d. (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2

MUS	491	Special Topics in Music (Section: Music and Religion in World Cultures)	2
MUS	491	Special Topics in Music (Section: Indigenous Music and Globalization)	2

Effective Fall 2023.

6. Change the requirements for the **Bachelor of Music** degree in **Jazz Studies** in the College of Music.

a. Under the heading **Requirements for the Bachelor of Music Degree in Jazz Studies** make the following changes:

(1) Reletter item 3. e. to 3. f.

(2) Add the following item 3. e.:

One of the following courses not used to satisfy 3. d. (2 credits):

MUS	409	American Music	2
MUS	410	Jazz History	2
MUS	419	Baroque Music	2
MUS	420	Music of the 18th Century	2
MUS	421	Music of the 19th Century	2
MUS	422	Music of the 20th Century	2
MUS	423	History of Opera	2
MUS	424	Music, Sexuality, and Gender	2
MUS	425	Music of South Asia and Its Diaspora	2
MUS	426	Music of Africa	2
MUS	427	Early Music	2
MUS	429	Music of East Asia	2
MUS	430	Music of the Caribbean	2
MUS	491	Special Topics in Music (Section: Music and Religion in World Cultures)	2
MUS	491	Special Topics in Music (Section: Indigenous Music and Globalization)	2

Effective Fall 2023.

COLLEGE OF NATURAL SCIENCE

1. Establish a **Dual Major** in **Environmental and Integrative Toxicological Sciences** in the College of Natural Science. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its February 20, 2023 meeting.

a. **Background Information:**

Environmental and Integrative Toxicological Sciences (EITS) is a dual major program in which students must first be admitted to one our partnering Ph.D. units. It is currently overseen by The Graduate School in conjunction with the Institute for Integrative Toxicology and will transition to the College of Natural Science Dean's office. At this time, these students are tracked via the programmatic code of this basic science department. Students from these programs, who meet certain requirements, could then join the EITS late in the first year or early in the second year of their program. Upon joining the EITS dual major program, students would then receive a new programmatic code that signifies their dual major status. This code raised several difficulties at the university, college, and program levels. The EITS would like to transition to a dual programmatic code system, similar to ESPP and EEBB. Under this new dual-code system, the student would retain their basic science code and, upon joining the EITS, receive an additional code to signify their acceptance into the dual major program. One result of this change is the EITS dual major code would become available to all Ph.D. candidates on campus. Given the EITS requirements, only qualified students are admitted. The EITS program currently partners with 17 graduate programs, as well as 5 colleges, providing training in toxicology to graduate student in those programs/colleges. The new dual coding system will expand the EITS reach across campus;

however, we do not envision that many, if any, will come from other programs other than the current 17.

The EITS program has been a successful program in training students to become leaders in the field of toxicology for over the last three decades and has been successful in holding the longest NIEHS training grant at MSU. By moving towards a dual programmatic code system, all parties involved will be able to track students' progress and major codes that have not been used due to the current system (i.e. having a new major code once admitted to EITS) will be removed from system, thus helping with accreditation.

b. **Academic Programs Catalog Text:**

Dual Major

The dual major in environmental and integrative toxicological sciences is administered by the College of Natural Science. The dual major is available only to those students who plan to complete a Ph.D. degree program that involves environmental and integrative toxicological sciences and who have a graduate major at Michigan State University. The student does not have the option of completing a dual major in environmental and integrative toxicological sciences alone.

The purpose of the Dual Major Ph.D. in Environmental and Integrative Toxicological Sciences (EITS) is to provide students with training in a basic science discipline and training and credentials in environmental and integrative toxicological sciences. Students accepted into a science-related Doctor of Philosophy degree programs may apply subsequently for admission to the environmental and integrative toxicological sciences program. Students who complete this multidisciplinary course of study earn the Ph.D. degree in a basic science discipline with a dual major in environmental and toxicological sciences.

Each program that cooperates with the environmental and integrative toxicological sciences program is represented by training faculty affiliated with Michigan State University's Institute for Integrative Toxicology, through which the Doctoral Program in Environmental and Integrative Toxicological Sciences is administered in conjunction with the College of Natural Science. The program allows students substantial flexibility in choosing areas of study. Each student's course of study is planned with that individual's particular interests, capabilities, and professional goals in mind. The student must meet the requirements for the partnering disciplinary program and the requirements for the environmental toxicology dual major.

In partial fulfillment of the environmental toxicology major, the student must complete the biomedical toxicology track, the food toxicology and ingredient safety track, or the environmental toxicology track. Course requirements for the biomedical toxicology track are designed for doctoral students in biomedical disciplines. The food toxicology and ingredient safety track require courses in toxicology and risk assessment and regulation of food-borne ingredients. Course requirements for the environmental toxicology track are designed for doctoral students in engineering, chemistry and other fields who may have less background in mammalian biology.

When all requirements for the degree have been met, both the chairperson of the department or program that administers the student's disciplinary major and the director of the Dual Major Ph.D. in Environmental and Integrative Toxicological Sciences program will recommend the student for the degree.

Where course requirements for a disciplinary major and for the environmental toxicology major overlap, a given course may be counted toward both requirements.

In addition to meeting the requirements of the University and of the College of Natural Science, students must meet the requirements specified below.

Admission

A student must be accepted for graduate study into a department or program that offers the student the opportunity to meet EITS admissions requirements, such as a science-based discipline, before applying for admission to the Dual Major Ph.D. in Environmental and Integrative Toxicological Sciences. Admission requires the approval of the environmental and integrative toxicological sciences graduate committee and the program director.

The student must:

1. have earned at least a bachelor's degree;
2. have completed, with a minimum grade–point average of 3.0, sufficient credits in the biological, chemical, and physical sciences to indicate probable success in the program.
3. have a dissertation project related to toxicology.
4. at least two guidance committee members affiliated with the Institute for Integrative Toxicology.

In special cases, an applicant with deficiencies in background courses may be admitted on a provisional basis. Students admitted on a provisional basis will not be considered for an advanced degree until they have fulfilled the provisional requirements. Course work required to remedy deficiencies will not count towards the dual major degree.

Guidance Committee

At least two members of the student's guidance committee must be faculty affiliated with the Institute for Integrative Toxicology. At least one member of the committee must be from a department or disciplinary program other than the one that administers the student's disciplinary major.

Requirements for the Dual Major Ph.D. Degree in Environmental in Environmental and Integrative Toxicological Sciences

1. The topic of the doctoral dissertation research must be in the broad area of environmental and integrative toxicological sciences and be acceptable to the environmental and integrative toxicological sciences faculty.
2. The student must complete the requirements for one of the three tracks with a grade–point average of at least 3.0.
3. The student must attend and participate in at least 12 EITS approved seminars in toxicological sciences.

Effective Fall 2023.

2. Establish a **Bachelor of Science** degree in **Integrated Science-Secondary Education** in the College of Natural Science. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 16, 2023 meeting. The Teacher Education Council (TEC) recommended approval of this request at its March 13, 2023 meeting.

The concentrations in the Bachelor of Science degree in Integrated Science-Secondary Education are noted on the student's academic record when the requirements for the degree have been completed.

a. **Background Information**:

A new undergraduate degree program is required to meet the new Standards for the Preparation of High School (7-12) Science Teachers approved by the Michigan Department of Education in February 2022 (*https://www.michigan.gov/mde/-/media/Project/Websites/mde/educator_services/prep/standards/HS_Science_Teacher_Preparation_Standards.pdf?rev=cc6a0c7226b94c78a81b47fff2f69122&hash=398961EB0190C07472D28B34664A7232*).

Going forward, all candidates seeking certification to teach science at the secondary level in Michigan must complete a degree program aligned with the new standards, which will prepare them to teach life science (biology), chemistry, earth and space science, and physics. The Integrated Science-Secondary Education degree program will replace the four existing science subject matter teaching majors for secondary teaching certification: Biological Science-Secondary Education, Chemistry, Physical Science-Secondary Education, and Physics.

Public education in the State of Michigan and across the country is facing a significant shortage of qualified science teachers. Through collaboration, MSU's College of Natural Science and the

College of Education Teacher Preparation Program have a strong history of training highly qualified science teachers. This new program was developed in response to two significant policy changes to allow MSU to continue training high school science teachers. In February 2022, the Michigan Department of Education approved new standards for secondary science teachers (grades 7-12) that require all new science teachers to have the disciplinary content knowledge to teach subjects across the natural sciences (life science, chemistry, earth and space science, and physics). None of NatSci's existing teaching majors are fully aligned with the new standards. At the same time, MSU's Teacher Preparation Program made the decision to shorten the program length from five years to four years to reduce the costs associated with preparing to become a teacher and to get new teachers into the classroom sooner. This new program will allow MSU to continue its success in preparing highly qualified high school science teachers.

Development of strong science content knowledge is essential to preparing teacher candidates to teach science at the secondary level. Students in this degree program will build disciplinary science content knowledge in courses offered by units in the College of Natural Science. The College of Natural Science will administer and provide academic advising to support the Integrated Science-Secondary Education major. The Dean's Office currently provides oversight for the existing interdisciplinary science teaching majors (Biological Science-Secondary Education and Physical Science-Secondary Education), which will be replaced by the new major.

The educational objective of this program is to support future science teachers in 1) building foundational science content knowledge and 2) developing the elements of effective teaching practice so that they can become highly effective high school science teachers who equitably serve diverse student populations.

Preparing the next generation of high school science teachers is a priority for the College of Natural Science and the College of Education. The two colleges are committed to collaborating in this effort. Increasing the number of well-qualified high school science teachers is critical to preparing Michigan's students for higher education and other post-secondary training to meet Michigan's workforce needs.

b. **Academic Programs Catalog Text**:

The Bachelor of Science Degree in Integrated Science-Secondary Education is designed for persons who want a broad background in biology, chemistry, earth and space science, and physics and to understand the interrelationships between these disciplines. This major is designed primarily for persons who plan to teach science (life science, chemistry, earth and space science, or physics) in secondary schools.

Requirements for the Bachelor of Science Degree in Integrated Science-Secondary Education

CREDITS

1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Integrated Science-Secondary Education.
   The University's Tier II writing requirement for the Integrated Science-Secondary Education major is met by completing Integrated Science Education 401. That course is referenced in item 3. below.
   Students who are enrolled in the College of Natural Science may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading *Graduation Requirements in the College* statement. Certain courses referenced in requirement 3. below may be used to satisfy the alternative track.
   Students may substitute Teacher Education 101 and 102 for two ISS requirements.
   Students may substitute Teacher Education 341 for the first-level IAH requirement (courses numbered 201 through 210). Those courses are referenced in item 3. below.
2. The requirements of the College of Natural Science for the Bachelor of Science degree.
   The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.
3. The following requirements for the major:
   a. One of the following groups of courses (9 or 10 credits):

(1)	BS	161	Cell and Molecular Biology	3
	BS	162	Organismal and Population Biology	3
	BS	171	Cell and Molecular Biology Laboratory	2

		BS	172	Organismal and Population Biology Laboratory	2
	(2)	BS	181H	Honors Cell and Molecular Biology	3
		BS	182H	Honors Organismal and Population Biology	3
		BS	191H	Honors Cell and Molecular Biology Laboratory	2
		BS	192H	Honors Organismal and Population Biology Laboratory	2
	(3)	LB	144	Biology I: Organismal Biology	4
		LB	145	Biology II: Cellular and Molecular Biology	5
b.	One of the following groups of courses (9 or 10 credits):				
	(1)	CEM	141	General Chemistry	4
		CEM	142	General and Inorganic Chemistry	3
		CEM	161	Chemistry Laboratory I	1
		CEM	162	Chemistry Laboratory II	1
	(2)	CEM	151	General and Descriptive Chemistry	4
		CEM	152	Principles of Chemistry	3
		CEM	161	Chemistry Laboratory I	1
		CEM	162	Chemistry Laboratory II	1
	(3)	CEM	181H	Honors Chemistry I	4
		CEM	182H	Honors Chemistry II	4
		CEM	185H	Honors Chemistry Laboratory I	2
	(4)	LB	171	Principles of Chemistry I	4
		LB	171L	Introductory Chemistry Laboratory I	1
		LB	172	Principles of Chemistry II	3
		LB	172L	Principles of Chemistry II-Reactivity Laboratory	1
c.	One of the following groups of courses (8 or 10 credits):				
	(1)	PHY	173	Studio Physics for Scientists and Engineers I	5
		PHY	174	Studio Physics for Scientists and Engineers II	5
	(2)	PHY	183	Physics for Scientists and Engineers I	4
		PHY	184	Physics for Scientists and Engineers II	4
		PHY	191	Physics Laboratory for Scientists, I	1
		PHY	192	Physics Laboratory for Scientists, II	1
	(3)	PHY	221	Studio Physics for Life Scientists I	4
		PHY	222	Studio Physics for Life Scientists II	4
	(4)	PHY	231	Introductory Physics I	3
		PHY	232	Introductory Physics II	3
		PHY	251	Introductory Physics Laboratory I	1
		PHY	252	Introductory Physics Laboratory II	1
	(5)	LB	273	Physics I	4
		LB	274	Physics II	4
d.	All of the following courses (14 credits):				
		IBIO	355	Ecology	3
		ISE	322	Foundational Earth Systems for Secondary Science Education	4
		ISE	401	Science Laboratories for Secondary Schools (W)	4
		ISE	420	Integrated Science Research	3
e.	The following Professional Education Courses in the College of Education (36 credits):				
	(1)	All of the following courses from the shared professional sequence (18 credits):			
		CEP	240	Diverse Learners in Multicultural Perspective	3
		TE	101	Social Foundations of Justice and Equity in Education	3
		TE	102	Pedagogy and Politics of Justice and Equity in Education	3
		TE	150	Reflections on Learning	3
		TE	302	Literacy and Adolescent Learners in School and Community Contexts	3
		TE	341	Teaching and Learning of (Bi)Multilingual Learners	3

(2) All of the following courses from the subject-specific professional sequence (18 credits):

TE	321	Clinical Experience in Science Education I	3
TE	421	Clinical Experience in Science Education II	3
TE	422	Seminar in Science Education I	3
TE	423	Seminar in Science Education II	3
TE	424	Student Teaching Internship in Science Education	6

f. One of the following concentrations:

Biology

(1) One course from group (a) and one course from group (b) (6 to 8 credits):

(a)	MTH	124	Survey of Calculus I	3
	MTH	132	Calculus I	3
	MTH	152H	Honors Calculus I	3
	LB	118	Calculus I	4
(b)	MTH	126	Survey of Calculus II	3
	MTH	133	Calculus II	4
	MTH	153H	Honors Calculus II	3
	LB	119	Calculus II	4
	STT	201	Statistical Methods	4
	STT	231	Statistics for Scientists	3
	STT	351	Probability and Statistics for Engineering	3
	STT	421	Statistics I	3

(2) One of the following groups of courses (3 or 6 credits):

(a)	CEM	144	Organic Chemistry and Applications	3
(b)	CEM	251	Organic Chemistry I	3
	CEM	252	Organic Chemistry II	3
(c)	CEM	351	Organic Chemistry I	3
	CEM	352	Organic Chemistry II	3
(d)	LB	271	Organic Chemistry	3
	CEM	252	Organic Chemistry II	3

(3) All of the following courses (8 credits):

IBIO	341	Fundamental Genetics	4
IBIO	355L	Ecology Laboratory (W)	1
IBIO	445	Evolution (W)	3

(4) One of the following courses (3 or 4 credits)

BMB	401	Comprehensive Biochemistry	4
FW	417	Wetland Ecology and Management	3
IBIO	408	Histology	4
IBIO	425	Cells and Development (W)	4
MMG	301	Introductory Microbiology	3
NEU	300	Neurobiology	3
PLB	415	Plant Physiology	3
PLB	418	Plant Systematics	3
PLB	441	Plant Ecology	3
PSL	250	Introductory Physiology	4
PSL	310	Physiology for Pre-Health Professionals	4

Chemistry

(1) One course from group (a) and one course from group (b) (6 to 8 credits):

(a)	MTH	132	Calculus I	3
	MTH	152H	Honors Calculus I	3
	LB	118	Calculus I	4
(b)	MTH	133	Calculus II	4
	MTH	153H	Honors Calculus II	3
	LB	119	Calculus II	4

(2) One of the following groups of courses (6 credits):

(a)	CEM	251	Organic Chemistry I	3
	CEM	252	Organic Chemistry II	3
(b)	CEM	351	Organic Chemistry I	3
	CEM	352	Organic Chemistry II	3

	(c)	LB	271	Organic Chemistry	3
		CEM	252	Organic Chemistry II	3
(3)	All of the following courses (9 credits):				
	CEM	255		Organic Chemistry Laboratory	2
	CEM	262		Quantitative Analysis	3
	CEM	383		Introductory Physical Chemistry I	3
	CEM	444		Chemical Safety	1
(4)	One of the following courses (3 or 4 credits):				
	BMB	401		Comprehensive Biochemistry	4
	CEM	311		Inorganic Chemistry	3
	CEM	384		Introductory Physical Chemistry II	3

Physics

(1)	One course from group (a) and one course from group (b) (6 to 8 credits):				
	(a)	MTH	132	Calculus I	3
		MTH	152H	Honors Calculus I	3
		LB	118	Calculus I	4
	(b)	MTH	133	Calculus II	4
		MTH	153H	Honors Calculus II	3
		LB	119	Calculus II	4
(2)	One of the following groups of courses (3 or 6 credits):				
	(a)	CEM	144	Organic Chemistry and Applications	3
	(b)	CEM	251	Organic Chemistry I	3
		CEM	252	Organic Chemistry II	3
	(c)	CEM	351	Organic Chemistry I	3
		CEM	352	Organic Chemistry II	3
	(d)	LB	271	Organic Chemistry	3
		CEM	252	Organic Chemistry II	3
(3)	All of the following courses (14 credits):				
	CMSE	201		Computational Modeling and Data Analysis I	4
	MTH	234		Multivariable Calculus	4
	MTH	235		Differential Equations	3
	PHY	215		Thermodynamics and Modern Physics	3
(4)	One of the following courses (3 or 4 credits):				
	PHY	321		Classical Mechanics I	3
	PHY	431		Optics I	3
	PHY	440		Electronics	4
	PHY	481		Electricity and Magnetism I	3

Earth Science

(1)	One course from group (a) and one course from group (b) (6 to 8 credits):				
	(a)	MTH	124	Survey of Calculus I	3
		MTH	132	Calculus I	3
		MTH	152H	Honors Calculus I	3
		LB	118	Calculus I	4
	(b)	MTH	126	Survey of Calculus II	3
		MTH	133	Calculus II	4
		MTH	153H	Honors Calculus II	3
		LB	119	Calculus II	4
		STT	201	Statistical Methods	4
		STT	231	Statistics for Scientists	3
		STT	351	Probability and Statistics for Engineering	3
		STT	421	Statistics I	3
(2)	One of the following groups of courses (3 or 6 credits):				
	(a)	CEM	144	Organic Chemistry and Applications	3
	(b)	CEM	251	Organic Chemistry I	3
		CEM	252	Organic Chemistry II	3
	(c)	CEM	351	Organic Chemistry I	3
		CEM	352	Organic Chemistry II	3
	(d)	LB	271	Organic Chemistry	3
		CEM	252	Organic Chemistry II	3
(3)	The following course (4 credits):				
	GLG	201		The Dynamic Earth	4

(4) Two of the following courses (6 to 8 credits):

GLG	303	Oceanography	3
GLG	304	Physical and Biological History of the Earth	4
GLG	321	Mineralogy and Geochemistry	4
GLG	361	Igneous and Metamorphic Geochemistry and Petrology	4
GLG	401	Global Tectonics and Earth Structure (W)	4
GLG	411	Hydrogeology	3
GLG	412	Glacial Geology and the Record of Climate Change	4
GLG	421	Environmental Geochemistry	4
GLG	435	Geomicrobiology	4
GLG	440	Planetary Geology	3

Effective Fall 2023.

3. Establish a **Bachelor of Science** degree in **Mathematics-Secondary Education** in the Department of Mathematics. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 16, 2023 meeting. The Teacher Education Council (TEC) recommended approval of this request at its March 13, 2023 meeting.

a. **Background Information**:

Based on an extensive discussion with representatives from the College of Education, and agreement by the Mathematics Undergraduate Studies Committee, this proposal will create a new major, a Bachelor of Science Degree in Mathematics-Secondary Education. The new 6-12 teacher certificate standards (*https://www.michigan.gov/-/media/Project/Websites/mde/educator_services/prep/standards/mathematics_standards_59_712.pdf?rev=88a6c576b1b248cc8829dc64f8a41421*) in the state of Michigan necessitate the need for the new program along with the university's desire to have students complete the Bachelor's degree in 4 years while completing the teacher certification requirements.

The former pathway, a 4-year bachelor's and one year of graduate study, will no longer be an option. Based on current requirements of the Bachelor of Science Degree in Mathematics, it is not possible for a student to complete all requirements for the existent Mathematics BS and teacher certification requirements in 4 years. Therefore, the proposed new degree offers the core requirements needed to adequately prepare students pursuing Secondary Education in Mathematics, and providing the option of becoming certified to teach Mathematics at the Secondary level.

b. **Academic Programs Catalog Text**:

The Bachelor of Science Degree in Mathematics-Secondary Education adequately prepares students to teach mathematics at the secondary level. Students gain a thorough foundation of mathematics, both in content and practice, and a comprehensive understanding of educational pedagogy and instructional methods.

Requirements for the Bachelor of Science Degree in Mathematics-Secondary Education

CREDITS

1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Mathematics-Secondary Education.
   The University's Tier II writing requirement for the Mathematics-Secondary Education major is met by completing Mathematics 309 and 396. Those courses are referenced in item 3. below.
   Students may substitute Teacher Education 101 and 102 for two ISS requirements.
   Students may substitute Teacher Education 341 for one IAH requirement.
2. The requirements of the College of Natural Science for the Bachelor of Science degree.
   The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.
3. The following requirements for the major:

a. The following courses outside the Department of Mathematics (19 to 23 credits):

(1) One course of at least 3 credits in biological science, entomology, Microbiology, physiology, plant biology, or integrative biology. At least 2 credits in laboratory in biological science, chemistry, microbiology, physics, physiology, plant biology, or integrative biology.
This requirement is met by fulfilling the course requirements in item 3. a. (2) (c) below and 1 additional credit if not taking CEM 185H.

(2) One course from each of the following groups (8 or 10 credits):

(a)	CEM	141	General Chemistry	4
	CEM	151	General and Descriptive Chemistry	4
	CEM	181H	Honors Chemistry I	4
	LB	171	Principles of Chemistry I	4
(b)	CEM	142	General and Inorganic Chemistry	3
	CEM	152	Principles of Chemistry	3
	CEM	182H	Honors Chemistry II	4
	LB	172	Principles of Chemistry II	3
(c)	CEM	161	Chemistry Laboratory I	1
	CEM	185H	Honors Chemistry Laboratory I	2
	LB	171L	Introductory Chemistry Laboratory I	1

(d) One of the following groups of courses (8 to 10 credits):

(i)	PHY	183	Physics for Scientists and Engineers I	4
	PHY	184	Physics for Scientists and Engineers II	4
(ii)	PHY	193H	Honors Physics I – Mechanics	4
	PHY	294H	Honors Physics II – Electromagnetism	4
(iii)	LB	273	Physics I	4
	LB	274	Physics II	4
(iv)	PHY	173	Physics I	5
	PHY	174	Physics II	5

b. The following courses in the Department of Mathematics (33 to 37 credits):

(1) One course from each of the following two groups (7 or 8 credits):

(a)	MTH	132	Calculus I	3
	MTH	152H	Honors Calculus	3
	LB	118	Calculus I	4
(b)	MTH	133	Calculus II	4
	MTH	153H	Honors Calculus II	4
	LB	119	Calculus II	4

(2) One of the following courses (4 credits):

MTH	234	Multivariable Calculus	4
MTH	254H	Honors Multivariable Calculus	4
LB	220	Calculus III	4

(3) One of the following two groups of courses (4 or 7 credits):

(a)	MTH	299	Transitions	4
	MTH	309	Linear Algebra I	3
(b)	MTH	317H	Honors Linear Algebra	4

(4) All of the following courses (12 credits):

MTH	304	Algebra and Calculus for Secondary Education	3
MTH	305	Discrete and Computational Mathematics for Secondary Education	3
MTH	330	Higher Geometry	3
MTH	396	Capstone in Mathematics for Secondary Education (W)	3

(5) One of the following courses (3 credits):

MTH	310	Abstract Algebra I and Number Theory	3
MTH	418H	Honors Algebra I	3

(6) One of the following courses (3 credits):

MTH	320	Analysis I	3
MTH	327H	Honors Introduction to Analysis	3

c. The following computational and statistics courses from outside the Department of Mathematics (7 credits):

(1) One of the following courses (4 credits):

CMSE	201	Computational Modeling and Data Analysis I	4
CSE	231	Introduction to Programming I	4

(2) The following course (3 credits):

STT	430	Introduction to Probability and Statistics	3

d. The following Professional Education Courses in the Department of Teacher Education (36 credits):

(1) All of the following courses from the shared professional sequence (18 credits):

CEP	240	Diverse Learners in Multicultural Perspective	3
TE	101	Social Foundations of Justice and Equity in Education	3
TE	102	Pedagogy and Politics of Justice and Equity in Education	3
TE	150	Reflections on Learning	3
TE	302	Literacy and Adolescent Learners in School and Community Contexts	3
TE	341	Teaching and Learning of (Bi)Multilingual Learners	3

(2) All of the following courses from the subject-specific professional sequence (18 credits):

TE	314	Clinical Experiences in Mathematics Education I	3
TE	414	Clinical Experiences in Mathematics Education II	3
TE	415	Seminar in Mathematics Education I	3
TE	416	Seminar in Mathematics Education II	3
TE	417	Student Teaching Internship in Mathematics Education	6

Effective Fall 2023.

4. Change the requirements for the **Bachelor of Science** degree in **Actuarial Science** in the Department of Mathematics. The University Committee on Undergraduate Education (UCUE) approved this request at its April 6, 2023 meeting.

a. Delete the section **Admission**.

b. Under the heading **Requirements for the Bachelor of Science Degree in Actuarial Science** make the following changes:

(1) Add the following new item 3. l.:

One of the following courses (4 credits):

CSE	231	Introduction to Programming I	4
CMSE	201	Computational Modeling and Data Analysis I	4
STT	180	Introduction to Data Science	4

(2) In item 3. k., delete the following course:

CSE	231	Introduction to Programming I	4

Effective Fall 2023.

5. Change the requirements in the **Master of Science** degree in **Microbiology and Molecular Genetics** in the Department of Microbiology and Molecular Genetics. The University Committee on Graduate Studies (UCGS) approved this request at its April 17, 2023 meeting.

a. Under the heading **Admission** delete the phrase:

", and grades of 3.0 or above in science and mathematics courses'.

b. Under the heading **Requirements for the Master of Science Degree in Microbiology and Molecular Genetics** replace the entire entry with the following:

The student must complete 30 credits under Plan A (with thesis) or Plan B (without thesis). The student's program of study must be approved by the student's guidance committee.

Requirements for Both Plan A and Plan B

1. Complete the following course (1 credit):

MMG	892	Seminar	1

2. Complete the following course (1 to 3 credits):

MMG	991	Topics in Microbiology	1 to 3

3. Complete four courses at the 800-level, covering areas of genetics, microbiology, and biochemistry. At least two of these courses must be offered by the Department of Microbiology and Molecular Genetics.

Students may select from the following courses:

BMB	801	Molecular Biology	3
BMB	802	Metabolic Regulation and Signal Transduction	3
BMB	805	Protein Structure, Design, and Mechanism	3
MMG	801	Integrative Microbial Biology	4
MMG	803	Topics in Integrative Microbial Biology	2
MMG	813	Molecular Virology	3
MMG	825	Cell Structure and Function	3
MMG	833	Microbial Genetics	3
MMG	835	Eukaryotic Molecular Genetics	3
MMG	852	Molecular Immunology	1
MMG	853	Cellular Immunology	1
MMG	854	Applied Immunology	1
MMG	861	Advanced Microbial Pathogenesis	3

Other courses may be used if approved by the Director of Graduate Studies.

4. Present and pass an oral examination in defense of the master's degree that covers both course work and thesis, research, or project.

Additional Requirements for Plan A

1. Complete a minimum of 7 credits of MMG 899 Master's Thesis Research.
2. Successfully complete the oral examination in defense of thesis.

Additional Requirements for Plan B

1. Complete a minimum of 7 credits of MMG 890 Special Problems in Microbiology.
2. Preparation and presentation of the final research report.

Effective Fall 2023.

COLLEGE OF SOCIAL SCIENCE

1. Establish a **Master of Science** degree in **Work and Organizational Psychology** in the Department of Psychology. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its January 23, 2023 meeting.

   a. **Background Information**:

   This proposal is to establish a completely online master's degree (Plan B, non-thesis) in Work and Organizational Psychology in the Department of Psychology. The degree program is a natural extension of the training currently provided to organizational psychology doctoral students and capitalizes on the expertise, experience, and reputations of the Psychology faculty. The organizational psychology area of study has consistently been ranked as the number 1 or 2 doctoral programs in the field. The target audiences are recent graduates with a social science bachelor's degree seeking masters-level training in an applied field to expand their career options. Individuals who are not currently working in the field but who want a career in organizational psychology, and early-career human resource professionals who desire formalized training.

   The course content for this 30-credit non-thesis program (21 to 24 months) is grounded in the core competencies for organizational psychology programs as identified by the professional Society of Industrial and Organizational Psychology. In addition, focus groups were conducted with experienced professionals in the field of organizational psychology to identify core competencies needed at the master's level. The development of this new program was precipitated by the recognition that the field is rapidly growing with the need for widely accessible, comprehensive masters-level training in Work and Organizational Psychology. The online courses are facilitated by faculty to ensure intensive discussions and application of materials to student experiences. The program incorporates hands-on capstone experiences on activities designed to develop skills in selection, training, survey development, and data analysis. Students must maintain a cumulative grade point average of 3.0 or higher.

   MSU is strongly positioned to offer an online master's degree in Work and Organizational Psychology. MSU's reputation of providing high quality education will draw students to the program and strengthen demand for our graduates on the job market. Additionally, organizational psychology is an international discipline, thus MSU's reputation as a leader in international education will help extend the reach of this program to students from other countries. Also, due to MSU's land grant philosophy and long-standing commitment to outreach and engagement, it fits well with an applied program in Work and Organizational Psychology.

   The Department of Psychology is uniquely suited to house this program. A contingent of our faculty have extensive experience and are internationally recognized for their work specifically in the area of organizational psychology. PhD students have been receiving training and practical experience in Organizational Psychology for over 70 years. The PhD students graduate with broad based skills that can be applied in a variety of professional settings beyond academics. Approximately 50% of our PhD graduates are employed in the private industry as internal or external consultants or in non-profit, and governmental agencies. Further, the faculty are actively involved in the Society of Industrial and Organizational Psychology and publish in relevant journals.

   b. **Academic Programs Catalog Text**:

   Students pursuing the Master of Science Degree in Work and Organizational Psychology will develop knowledge and skills in organizational theory, methods, and practice relevant to the role and responsibilities of positions in organizational psychology that meet professional practice standards. Graduates will be prepared to work as master's-level positions in a variety of professional settings.

   In addition to meeting the requirements of the university and of the College of Social Science, students must meet the requirements specified below.

   Admission

   To be considered for the Master of Science Degree in Work and Organizational Psychology, an applicant must:

   1. have a bachelor's degree from a recognized educational institution;

2. have an academic record equivalent to at least a 3.00 in the last two years of undergraduate work;
3. possess attributes such as intellectual curiosity, analytical thinking, and perseverance to have a high degree of potential for completion of the program and advancement to the roles and duties of individuals in an Organizational Psychology position.
4. submit three letters of recommendation and a personal statement regarding their academic and professional goals and experience.
5. if an international student, submit TOEFL scores.

Requirements for the Master of Science Degree in Work and Organizational Psychology

Students must complete 30 credits under Plan B (without thesis). The program is available only online.

				CREDITS
1.	All of the following courses (18 credits):			
	PSY	806	Consulting Roles and Professional Development	2
	PSY	807	Quantitative Analysis I	2
	PSY	808	Quantitative Analysis II	2
	PSY	816	Current Topics in Work and Organizational Psychology	2
	PSY	819	Testing and Measurement Development	2
	PSY	821	Staffing Organizations	2
	PSY	822	Performance Management	2
	PSY	823	Workplace Learning and Development	2
	PSY	824	Employee Attitudes and Engagement	2
2.	All of the following practicum courses (8 credits):			
	PSY	856	Practicum I: Making the Business Case	2
	PSY	857	Practicum II: Applied Skills in Data Analysis and Interpretation	2
	PSY	858	Practicum III: Developing a Training and Onboarding Program	2
	PSY	859	Practicum IV: Attitude Survey Development and Analysis	2
3.	Complete two special topics seminars (4 credits):			
	PSY	830	Special Topics	2
	This requirement is completed through two enrollments of PSY 830.			

Effective Fall 2024.

COLLEGE OF VETERINARY MEDICINE

1. Change the requirements for the **Minor** in **Pharmacology and Toxicology** in the Department of Pharmacology and Toxicology.

   a. Under the heading **Requirements for the Minor in Pharmacology and Toxicology** make the following changes:

      (1) Change the total credits from ‘18’ to ‘15’.

      (2) Delete item 3.

      (3) Change item 4. to item 3. and add the following courses:

PHM	211	Pharmacology and Toxicology in Society	2
PHM	454	Leadership and Teams for Scientists and Health Professionals	3
STT	231	Statistics for Scientists	3

Effective Fall 2023.

PART II - NEW COURSES

DEPARTMENT OF BIOMEDICAL ENGINEERING

BME 850 Dynamical Systems in Computational Biology
Spring of even years. 3(3-0) RB: Recommended: Calculus I, Introduction to Biology, and general familiarity with cell biology basics and ordinary differential equations.
Introduction to nonlinear dynamics with examples of applications in cell biology. Bifurcations, phase plane analysis for two-dimensional systems, oscillations, and limit cycles. Application of these concepts in systems biology.
Effective Spring Semester 2024

DEPARTMENT OF BIOSYSTEMS AND AGRICULTURAL ENGINEERING

BE 201 Drafting in Biosystems Engineering
Fall of every year. 1(0-2) P: (BE 101 or concurrently or approval of department) and ((MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)) and EGR 100 R: Open to undergraduate students in the Department of Biosystems and Agricultural Engineering.
Basic operations of drawings with application to Biosystems Engineering. Visualization and practical reading of drawings for engineering of biological systems.
Effective Fall Semester 2023

DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES

GLG 809 Integrative Earth Sciences
Fall of every year. 1(1-0)
Key topics in the Earth and Environmental Sciences as represented by the research foci of the current faculty and research staff including, geophysics, geochemistry, hydrology, and paleonotology.
Effective Fall Semester 2023

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EAD 935 Foundations for Equity-Minded Leaders in Postsecondary Education
Summer of every year. 3(3-0) RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Leadership in postsecondary education; theories of change in postsecondary education; basic diversity, equity, and inclusion concepts; program orientation.
Effective Summer Semester 2024

EAD 936 Law and Education Policy
Fall of every year. 3(3-0) Not open to students with credit in LAW 579D.
Free speech, racial and ethnic equity including desegregation and college access, sex/gender equity, title IX and other provisions of the higher education act.
Effective Fall Semester 2023

EAD 937A Equity-Oriented Inquiry for Leaders 1
Summer of every year. 3(3-0) RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Leadership inquiry as analytical framework for policy and practice: action and participatory research; theories of research and inquiry paradigms; development of skills in conducting literature reviews and identifying research problems; exploration of research praxis.
Effective Summer Semester 2025

EAD 937B Equity-Oriented Inquiry for Leaders 2
Summer of every year. 3(3-0) P: EAD 937A RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Leadership inquiry as an analytical framework for policy and practice: action and participatory research; theories of research and inquiry paradigms; basic techniques in quantitative, qualitative, and mixed methods research; exploration of research praxis. Proposal writing.
Effective Summer 2026

EAD 976 Budget and Finance for Equity in Postsecondary Education
Spring of every year. 3(3-0) RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Exploration of various budgeting and funding processes and concerns in postsecondary education. An equity-focused lens is employed to analyze inequalities and promote systemic change.
Effective Spring Semester 2026

EAD 996A Research Preparation 1
Fall of every year. 1(1-0) RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Processing of research questions, research design, and group dynamics in a cohort setting under faculty guidance.
Effective Fall Semester 2024

EAD 996B Research Preparation 2
Spring of every year. 1(1-0) P: EAD 996A RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Processing of research questions, research design, and group dynamics in a cohort setting under faculty guidance.
Effective Spring Semester 2025

EAD 996C Research Preparation 3
Fall of every year. 1(1-0) P: EAD 996B RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Processing of research questions, research design, and group dynamics in a cohort setting under faculty guidance.
Effective Fall Semester 2025

EAD 996D Research Preparation 4
Spring of every year. 1(1-0) P: EAD 996C RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Processing of research questions, research design, and group dynamics in a cohort setting under faculty guidance.
Effective Spring Semester 2026

EAD 998A Dissertation in Practice 1
Fall of every year. 4(4-0) RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Group dissertation research: design, execution, and analysis of group dissertation in practice research projects.
Effective Fall 2026

EAD 998B Dissertation in Practice 2
Spring of every year. 4(4-0) P: EAD 998A RB: In general, students should have a background as a higher education practitioner prior to taking this course. However, administrative aspirations with relevant adjacent experience are also acceptable.
Group dissertation research: design, execution, and analysis of group dissertation in practice research projects.
Effective Spring 2027

CENTER FOR INTEGRATIVE STUDIES IN GENERAL SCIENCE

ISB 206 Foundations in Community and Sustainability
Fall of every year. Spring of every year. 3(3-0) R: Open to undergraduate students.
Investigations and analysis of the environmental and social impacts of sustainability both locally and globally.
Effective Fall Semester 2024

ISB 230 Foundations of Biological Science for Teacher Education
Fall of every year. Spring of every year. 3(3-0) R: Open to undergraduate students in the Department of Teacher Education.
Using science practices to explore core ideas in biological and chemical systems by focusing on crosscutting concepts.
Effective Fall Semester 2024

ISE 322 Foundational Earth Systems for Secondary Science Education
Spring of every year. 4(3-1) R: Open to undergraduate students in the Department of Teacher Education.
Exploration of natural, physical, and chemical processes in the Universe, the planets and the Earth, while developing skills necessary to instruct others on these processes.
Effective Spring Semester 2024

ISP 231 Foundations of Physical Science for Teacher Education
Fall of every year. Spring of every year. 3(3-0) P: MTH 101 or MTH 103 or MTH 103B R: Open to undergraduate students in the Department of Teacher Education.
Using science practices to explore core ideas in physical systems by focusing on crosscutting concepts.
Effective Fall Semester 2024

SCHOOL OF JOURNALISM

JRN 875 Global Affairs Reporting
Fall of every year. 3(2-2) P: JRN 800 R: Open to graduate students.
REINSTATEMENT
Techniques and challenges in covering international events and issues such as economics, security, disasters, and public policy. Understanding international press systems, rights and constraints.
Effective Spring Semester 2023

MSU COLLEGE OF LAW

LAW 535W Law, Science, and Technology
On Demand. 0 to 6 credits. R: Open to students in the MSU College of Law.
Law's interaction with science and technology in specific fields like criminal law, evidence, family law, bioethics, employment and labor, environment, and international law.
Effective Fall Semester 2023

LAW 537W Conservative Legal Thought Reconsidered
On Demand. 0 to 6 credits. R: Open to students in the MSU College of Law.
The conservative intellectual tradition, as a reaction to Progressive- and Marxist-inspired jurisprudence, affects legal analysis, including deference to precedent, the role of virtue, centralization versus decentralization, free speech, and the criminal law.
Effective Fall Semester 2023

LAW 537X Free Speech, Technology, and Society
On Demand. 0 to 6 credits. R: Open to students in the MSU College of Law.
Current First Amendment free speech law as well as its historical development. Special focus will be placed on the First Amendment's application to the internet and new technologies.
Effective Fall Semester 2023

LAW 537Y Local Government Policy Lab
On Demand. 0 to 6 credits. P: LAW 580C R: Open to students in the MSU College of Law.
An opportunity to engage in local government practice, learn nontraditional legal analysis and writing skills, and interact with lawyers and policymakers about issues affecting residents and local administrators across Michigan.
Effective Spring Semester 2024

LAW 811J Food Law and Regulation in Latin America and the Caribbean
On Demand. 0 to 6 credits. R: Open to law advanced students in the MSU College of Law.
National and international food laws and regulations and applicable trade agreements in Latin America and the Caribbean, allowing them to facilitate efficient and compliant commercial transactions.
Effective Summer Semester 2023

LAW 811K Global Food Packaging Laws
On Demand. 0 to 6 credits. R: Open to law advanced students in the MSU College of Law.
Global overview of food contact substances and food contact materials. Overview of key definitions, regulatory issues, and law.
Effective Fall Semester 2023

DEPARTMENT OF MICROBIOLOGY AND MOLECULAR GENETICS

MMG 852 Molecular Immunology
Fall of every year. 1(1-0) RB: (MMG 451) or Basic knowledge of molecular biology, cell biology, physiology and genetics.
Protein structures and functions of immune receptors and molecules, gene expression and regulation, DNA rearrangements and antigen receptors diversifications.
SA: MMG 851
Effective Fall Semester 2023

MMG 853 Cellular Immunology
Fall of every year. 1(1-0) RB: (MMG 451) or Basic knowledge of molecular biology, cell biology, physiology, and genetics.
Cells in the immune system, lymphocytes development and differentiation, cellular interactions in immune responses.
SA: MMG 851
Effective Fall Semester 2023

MMG 854 Applied Immunology
Fall of every year. 1(1-0) RB: (MMG 451) or Basic knowledge of molecular biology, cell biology, physiology, and genetics.
Immunity against bacterial and viral infections, and cancer cells. Vaccines, Transplantation and Immunotherapies. Immunodeficiency and autoimmune diseases.
SA: MMG 851
Effective Fall Semester 2023

COLLEGE OF MUSIC

MUS 443 Anthropology of Music
Fall of odd years. 2(2-0) P: MUS 211 or MUS 212 or MUS 214 R: Open to juniors or seniors in the College of Music or approval of college.
REINSTATEMENT Study of social theories developed in anthropology and ethnomusicology.
Effective Fall Semester 2023

COLLEGE OF OSTEOPATHIC MEDICINE

OST 695 Global Health: Costa Rica Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 30 credits. A student may earn a maximum of 30 credits in all enrollments for this course. RB: Fluency in Spanish to interact with patients R: Open to graduate-professional students in the College of Osteopathic Medicine and open to undergraduate students or approval of college.
Observation of and supervised participation in host country's healthcare delivery system. Etiology, treatment, and control of endemic disease. Exploration of local culture and history.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Summer Semester 2023

DEPARTMENT OF PSYCHOLOGY

PSY 806 Consulting Roles and Professional Development
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
The practice of organizational psychology as an internal or external consultant.
Effective Fall Semester 2024

PSY 807 Quantitative Analysis I
Spring of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Foundational issues for statistical analysis and regression analysis.
Effective Spring Semester 2025

PSY 808 Quantitative Analysis II
Spring of every year. 2(2-0) P: PSY 807 R: Open to graduate students in the Department of Psychology.
Advanced issues in the application of multiple regression approaches.
Effective Spring Semester 2025

PSY 816 Current Topics in Work and Organizational Psychology
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Introduction to Industrial-Organizational psychology.
Effective Fall Semester 2024

PSY 819 Testing and Measurement Development
Spring of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Psychological testing theory and measurement development.
Effective Spring Semester 2025

PSY 821 Staffing Organizations
Spring of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Recruitment and selection practices and procedures for the workplace.
Effective Spring Semester 2025

PSY 822 Performance Management
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Performance management approaches for motivation and employee development.
Effective Fall Semester 2025

PSY 823 Workplace Learning and Development
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Research and practice to facilitate individual, team, and organizational learning and development.
Effective Fall Semester 2025

PSY 824 Employee Attitudes and Engagement
Spring of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Employee attitudes, engagement, and their outcomes.
Effective Spring Semester 2025

PSY 830 Special Topics
Spring of every year. 2(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. P: PSY 816 or approval of department R: Open to graduate students in the Department of Psychology.
Special topic areas relevant in work and organizational psychology.
Effective Spring Semester 2026

PSY 856 Practicum I: Making the Business Case
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Psychology.
Creating a persuasive business case to address an organizational problem.
Effective Fall Semester 2024

PSY 857 Practicum II: Applied Skills in Data Analysis and Interpretation
Summer of every year. 2(2-0) P: PSY 821 or approval of department R: Open to graduate students in the Department of Psychology.
Advanced issues in the application of multiple regression approaches to analyzing data.
Effective Summer Semester 2025

PSY 858 Practicum III: Developing a Training and Onboarding Program
Fall of every year. 2(2-0) P: PSY 823 or approval of department R: Open to graduate students in the Department of Psychology.
Assessment of training needs, development of a training plan, and the determination of training effectiveness.
Effective Fall Semester 2025

PSY 859 Practicum IV: Attitude Survey Development and Analysis
Spring of every year. 2(2-0) P: PSY 824 or approval of department R: Open to graduate students in the Department of Psychology.
Assessment of organizational issue, development attitude survey, implement survey, and analyze survey data and generate feedback report.
Effective Spring Semester 2026

DEPARTMENT OF SUPPLY CHAIN MANAGEMENT

SCM 801 Introduction to Global Business and Supply Chain
Fall of every year. Summer of every year. 2(2-0) R: Approval of department.
Introduction to business and communication skills necessary to compete successfully in a global environment. Basic business vocabulary and practices especially those related to the functions of supply chain management activities including procurement, manufacturing, and logistics.
Effective Fall Semester 2023

SCM 803 Introduction to Supply Chain Analytics
Fall of every year. Summer of every year. 3(3-0) P: SCM 801 or concurrently R: Approval of department.
Statistics topics including random variables, regression, forecasting, and index construction. Introduction of quantitative and statistical methods used for decision making. Discussion of different sources for supply chain data and their use in decisions.
Effective Fall Semester 2023

SCM 805 Basic Elements of Strategic Sourcing
Fall of every year. Spring of every year. 2(2-0) P: SCM 801 and SCM 803 R: Approval of department.
Introduction of strategic sourcing and supply chain management enterprise implications. Integration and coordination of sourcing, manufacturing, distribution, and logistics for global competitiveness.
Effective Spring Semester 2024

SCM 806 Basic Elements of Logistics and Warehousing
Fall of every year. Spring of every year. 2(2-0) P: SCM 801 and SCM 803 R: Approval of department.
Introduction to logistics and transportation services including order fulfillment, distribution operations, warehousing considerations, operation of transportation services, and third-party logistics providers.
Effective Spring Semester 2024

SCM 807 Basic Elements of Operations Management
Fall of every year. Spring of every year. 2(2-0) P: SCM 801 and SCM 803 R: Approval of department.
Overview of the planning and control functions required to match supply and demand in a manufacturing firm. Importance of coordination of plans across an organization and the information systems utilized for these functions.
Effective Spring Semester 2024

SCM 931 Simulation Methods for Business Research
Spring of odd years. 3(3-0) P: MGT 906 or SCM 916 or approval of department R: Open to doctoral students.
REINSTATEMENT Techniques and methodology for system design and policy formulation. Methodological focus on simulation and analytical techniques to develop empirical results documenting current and anticipated system performance.
SA: MSC 931
Effective Fall Semester 2023

PART III – COURSE CHANGES

DEPARTMENT OF AFRICAN AMERICAN AND AFRICAN STUDIES

AAAS 495 Writing For Our Lives (W)
Fall of every year. Spring of every year. ~~Summer of odd years.~~ 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P: {((AAAS 100) and completion of Tier I writing requirement) and (AAAS 200 or AAAS 201 or AAAS 202 or AAAS 300 or AAAS 301 or AAAS 302 or AAAS 303 or AAAS 304 or AAAS 305 or AAAS 306)} or (AAAS 307 or AAAS 308 or AAAS 390) ~~RB: ISS 215~~

Intensive writing workshop with focus on development of student voice through the power of the written and spoken word.

~~Effective Fall Semester 2021~~ Effective Fall Semester 2023

DEPARTMENT OF BIOSYSTEMS AND AGRICULTURAL ENGINEERING

BE 334 ~~Biosystems Engineering Laboratory Practice~~
Biosystems Engineering Laboratory Practice (W)
Fall of every year. 3(2-2) ~~P: (BE 101 or concurrently) and (BS 171 or BS 172) and PHY 184~~ P: ((BE 101 or concurrently) and completion of Tier I writing requirement) and (BS 171 or BS 172) and PHY 184 R: Open to juniors or seniors in the Department of Biosystems and Agricultural Engineering. C: BE 332 concurrently.

Sensors and instrumentation for measuring and analyzing properties of biological materials and systems.

~~Effective Fall Semester 2013~~ Effective Fall Semester 2023

BE 351 Thermodynamics for Biological Engineering
Fall of every year. 3(3-0) ~~P: (BE 101 or concurrently) and (MTH 235 or MTH 255H or LB 220) and (BS 161 or BS 181H or LB 145)~~ P: (BE 101 or concurrently) and (MTH 235 or MTH 340 or MTH 347H) and (BS 161 or BS 181H or LB 145) R: Open to juniors or seniors in the College of Engineering. Not open to students with credit in CHE 321 or ME 201.

Thermodynamics of biological systems. First and second laws of thermodynamics. Power and refrigeration cycles. Water relations and psychrometry. Chemical and phase equilibria.

~~Effective Fall Semester 2013~~ Effective Fall Semester 2023

BE 485 ~~Biosystems Design Techniques~~
Biosystems Design Techniques (W)
Fall of every year. 3(2-2) ~~P: BE 332 and BE 334 and BE 350 and BE 351 and BE 360 and BE 385 or approval of department~~ P: ((BE 332 and BE 334 and BE 350 and BE 351 and BE 360 and BE 385) or approval of department) and completion of Tier I writing requirement R: Open to juniors or seniors in the Biosystems Engineering major.

Engineering design process. Problem identification, analysis, design, modeling, materials, cost estimation, and final specifications. Safety, environmental, and ethical considerations. SA: BE 486

~~Effective Fall Semester 2013~~ Effective Fall Semester 2023

BE 487 ~~Biosystems Design Project (W)~~
Biosystems Design Project
Spring of every year. ~~3(0-6)~~ 3(2-2) ~~P: (BE 485) and completion of Tier I Writing requirement~~ P: BE 485 ~~R: Open to seniors in Biosystems Engineering major.~~ R: Open to seniors in the Biosystems Engineering Major.

Individual or team design project selected in BE 485. Information expansion, development of alternatives, and evaluation, selection, and completion of a design project. SA: AE 488

~~Effective Fall Semester 2013~~ Effective Fall Semester 2023

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 431

~~Pavement Design and Analysis~~
Design and Analysis for New and Rehabilitated Pavements
Fall of every year. ~~3(3-0)~~ 4(4-0) P: CE 337 R: Open to juniors or seniors or graduate students in the College of Engineering.

~~Highway and airfield pavement structural design. Performance measures. Failure mechanisms. Popular thickness design procedures. Design considerations for surface friction, pavement joints, and drainage.~~ Highway and airfield pavement structural design. Performance measures. Failure mechanisms. Popular thickness design procedures for new and rehabilitated pavements. Design considerations for surface friction, pavement joints, and drainage.

~~Effective Fall Semester 2017~~ Effective Fall Semester 2023

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSE 102

Algorithmic Thinking and Programming
Fall of every year. Spring of every year. Summer of every year. 3(2-2) ~~P: (MTH 103 or MTH 103B or MTH 116 or MTH 124 or MTH 132 or MTH 152H or LB 118) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 103B or MTH 116 or MTH 124 or MTH 132 or MTH 152H or LB 118 or LB 117) or designated score on Mathematics Placement test Not open to students with credit in CSE 231.

Fundamentals of computing, algorithms and programming, using a high-level language such as Python.

~~Effective Fall Semester 2020~~ Effective Fall Semester 2023

CSE 300

~~Social, Ethical, and Professional Issues in Computer Science~~
Social, Ethical, and Professional Issues in Computing
Fall of every year. Spring of every year. 1(1-0) P: CSE 232 ~~P: Open to undergraduate students in the Computational Data Science Major or in the Computer Science Major.~~ R: Open to undergraduate students in the College of Engineering.

Professional responsibilities and informed judgments in computing practice based on legal and ethical principles. Local and global impacts of computing solutions on individuals, organizations, and society.

~~Effective Fall Semester 2020~~ Effective Spring Semester 2024

CSE 425

Introduction to Computer Security
Fall of every year. Spring of every year. 3(3-0) ~~P: (CSE 422 or concurrently) or (ECE 442 or concurrently)~~ P: CSE 325 R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.

Theory and practice of computer security engineering.

~~Effective Fall Semester 2020~~ Effective Fall Semester 2023

DEPARTMENT OF FISHERIES AND WILDLIFE

FW 293

Undergraduate Seminar in Fisheries and Wildlife
Fall of every year. Spring of every year. 1(0-2) P: FW 101 or concurrently ~~R: Open to undergraduate students in the Fisheries and Wildlife major or in the Lyman Briggs Fisheries and Wildlife Coordinate major.~~ R: Open to undergraduate students in the Lyman Briggs College or in the Department of Fisheries and Wildlife.

Professional development and discussion of current case studies to prepare students for a career in Fisheries and Wildlife.

~~Effective Fall Semester 2014~~ Effective Spring Semester 2024

~~FW 434~~
FW 334 ~~Human Dimensions of Fisheries and Wildlife Management (W)~~
Human Dimensions of Fisheries and Wildlife Management
Fall of every year. 3(2-2) ~~P: (IBIO 355) and completion of Tier I writing requirement~~ P: (BS 162) and completion of Tier I writing requirement RB: IBIO 355 ~~R: Open to juniors or seniors or approval of department.~~ R: Not open to freshmen or approval of department.
~~Sociological implications of public policy and planning processes in fisheries and wildlife management.~~ Principles and application of social science in fisheries and wildlife conservation and management.
SA: FW 434
~~Effective Fall Semester 2016~~ Effective Spring Semester 2024

FW 445 Biodiversity Conservation Policy and Practice
~~Spring of even years.~~ Spring of every year. 3(3-0) Interdepartmental with James Madison College. P: Completion of Tier I Writing Requirement RB: ((EC 201 or concurrently) or (EC 202 or concurrently) or (EC 251H or concurrently) or (EC 252H or concurrently)) and an interest in Conservation Biology
Social, economic, and policy considerations. Approaches to conserve biodiversity.
~~Effective Fall Semester 2014~~ Effective Spring Semester 2024

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION

FSC 481 Fermented Beverages
Fall of every year. ~~Lansing, Lansing, Lansing~~ ~~3(2-2)~~ 3(3-0) ~~R: Open to juniors. Approval of department.~~
Origin and history of alcoholic beverages produced by fermentation; types of products and methods of production; relationships among agricultural practices, processing and sensory attributes; responsible consumption of alcoholic beverages.
~~Effective Fall Semester 2013~~ Effective Spring Semester 2024

DEPARTMENT OF GEOGRAPHY, ENVIRONMENT, AND SPATIAL SCIENCES

GEO 326 Cartographic Design and Production
~~Fall of every year.~~ Summer of every year. 4(2-4) P: GEO 221 and GEO 221L
Map design, layout, and usability. Typography and color theory. Techniques of map production, print and digital display.
SA: GEO 423
~~Effective Fall Semester 2017~~ Effective Fall Semester 2023

GEO 402 Agricultural Climatology
Fall of even years. 3(3-0) Interdepartmental with Biosystems Engineering. ~~P: MTH 110 or MTH 116~~ P: (LB 117 or concurrently) or (LB 118 or concurrently) or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or approval of department
Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.
~~Effective Spring Semester 2023~~ Effective Fall Semester 2023

GEO 405 Weather Analysis and Forecasting
Spring of even years. 4(3-2) ~~P: GEO 203 and (MTH 110 or MTH 116)~~ P: (GEO 203 or approval of department) and ((LB 117 or concurrently) or (LB 118 or concurrently) or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or approval of department)
Dynamic and thermodynamic principles of atmospheric science applied to the development and evolution of extratropical cyclones. Laboratory sessions include analysis of current observations and satellite imagery.
~~Effective Spring Semester 2018~~ Effective Fall Semester 2023

GEO 429 ~~Geoprocessing~~
Programming with Spatial Data
Spring of every year. 3(3-0) ~~P: GEO 325 or GEO 802 or approval of department~~ P: GEO 221 or GEO 325 or GEO 425 or GEO 802 or approval of department RB: CMSE 201 or CSE 231 or FOR 372 or PLS 202
~~Applications of computer programming to address geographic information problems. Integration of digital spatial data, geographic information systems, spatial analysis, and expert systems.~~ Applications of computer programming, such as Python, to address geographic information problems. Integration of digital spatial data, geographic information systems, spatial analysis, and expert systems.
~~Effective Fall Semester 2017~~ Effective Spring Semester 2024

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES

HDFS 320 Interaction with Children in Groups
Fall of every year. Spring of every year. 3(3-0) ~~P: HDFS 211~~ P: HDFS 211 or TE 101 ~~R: Open to students in the Department of Human Development and Family Studies.~~ R: Open to students in the College of Education or in the Department of Human Development and Family Studies. C: HDFS 320L concurrently.
Principles of verbal and non-verbal interaction in relation to children's behavior in groups. Focus on young children in early childhood programs.
SA: FCE 320
~~Effective Fall Semester 2016~~ Effective Spring Semester 2024

HDFS 320L Interaction with Children-Laboratory
Fall of every year. Spring of every year. 1(0-4) ~~P: HDFS 211~~ P: HDFS 211 or TE 101 ~~R: Open to students in the Department of Human Development and Family Studies.~~ R: Open to students in the or in the College of Education or in the Department of Human Development and Family Studies. C: HDFS 320 concurrently.
Practice applying principles of interaction to individuals and small groups in early childhood programs.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
SA: FCE 320L
~~Effective Fall Semester 2016~~ Effective Spring Semester 2024

HDFS 321 Curriculum for Children (W)
Fall of every year. Spring of every year. 3(3-0) P: (HDFS 320) and completion of Tier I writing requirement ~~R: Open to students in the Department of Human Development and Family Studies.~~ R: Open to students in the College of Education or in the Department of Human Development and Family Studies. C: HDFS 321L concurrently.
Child development principles and accreditation standards for designing curricula for early childhood programs. Planning and evaluating learning activities and programs.
SA: FCE 321
~~Effective Fall Semester 2016~~ Effective Spring Semester 2024

HDFS 321L Curriculum for Children - Laboratory
Fall of every year. Spring of every year. 1(0-4) P: HDFS 320L ~~R: Open to students in the Department of Human Development and Family Studies.~~ R: Open to students in the College of Education or in the Department of Human Development and Family Studies. C: HDFS 321 concurrently.
Supervised practice in providing learning activities for individual children and small groups. Planning, implementing, and evaluating activities. Field trips may be required.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
SA: FCE 321L
~~Effective Fall Semester 2016~~ Effective Spring Semester 2024

DEPARTMENT OF INTEGRATIVE BIOLOGY

IBIO 483 ~~Environmental Physiology (W)~~
Environmental Physiology
Spring of every year. ~~4(4-0)~~ 3(3-0) ~~P: ((BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement) and (BS 162 or LB 144 or BS 182H) and (CEM 141 or CEM 151 or CEM 181H or LB 171)~~ P: (BS 161 or LB 145 or BS 181H) and (BS 162 or LB 144 or BS 182H) and (CEM 141 or CEM 151 or CEM 181H or LB 171)
~~Aspects of physiology important to the environmental relations of vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, and exercise physiology.~~ Physiological adaptation to environments and consequences of environmental change in vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, extreme habitat physiology, and physiological response to climate change.
SA: ZOL 483
~~Effective Spring Semester 2023~~ Effective Spring Semester 2024

SCHOOL OF JOURNALISM

JRN 892 Journalism Special Topics
Fall of every year. Spring of every year. Summer of every year. ~~1 to 3 credits.~~ 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
Topics vary.
~~Effective Summer Semester 2020~~ Effective Fall Semester 2022

DEPARTMENT OF KINESIOLOGY

KIN 345 ~~Sport and Exercise Psychology (W)~~
Exercise Psychology (W)
Fall of every year. Spring of every year. 3(2-2) P: (KIN 240) and completion of Tier I writing requirement
Theoretical, conceptual, and practical issues related to the psychology of exercise behaviors.
Effective Fall Semester 2023

LYMAN BRIGGS COLLEGE

LB 118 Calculus I
Fall of every year. Spring of every year. 4(4-0) ~~P: (LB 117 or MTH 114 or MTH 116) or designated score on Mathematics Placement test~~ P: (LB 117) or (MTH 103 and MTH 114) or (MTH 103B and MTH 114) or (MTH 116 or designated score on Mathematics Placement test) R: Open to students in the Lyman Briggs College. ~~Not open to students with credit in MTH 152H or MTH 132 or MTH 153H.~~ Not open to students with credit in MTH 152H or MTH 132.
Limits, continuity, differentiation, integration, and elementary applications.
SA: LBS 118
~~Effective Fall Semester 2018~~ Effective Spring Semester 2023

LB 172 Principles of Chemistry II
Fall of every year. Spring of every year. 3(4-0) P: LB 171 or CEM 141 or CEM 151 or CEM 181H ~~R: Open to students in the Lyman Briggs College.~~ R: Open to undergraduate students in the Lyman Briggs College. Not open to students with credit in CEM 152 or CEM 182H or CEM 142. ~~C: LB 172L concurrently.~~
Gases, properties of solutions, introduction to solid state chemistry, molecular orbital theory, chemical equilibria, chemical kinetics, acid/base equilibria, solubility equilibria, entropy, free energy, electrochemistry, redox reactions, nuclear chemistry.
SA: LBS 172, LBS 266
~~Effective Spring Semester 2014~~ Effective Fall Semester 2023

LB 172L Principles of Chemistry II - Reactivity Laboratory

Fall of every year. Spring of every year. 1(0-3) ~~P: (LB 171 or CEM 141 or CEM 152 or CEM 182H) and (LB 171L or CEM 161 or CEM 185H)~~ P: (CEM 152 or CEM 182H) or (LB 172 or concurrently) and (LB 171L or CEM 161) R: Open to students in the Lyman Briggs College. Not open to students with credit in CEM 162. ~~C: LB 172 concurrently.~~

Synthesis and characterization of chemical systems.

SA: LBS 172L, LBS 266L

~~Effective Spring Semester 2014~~ Effective Fall Semester 2023

LB 271 Organic Chemistry

Fall of every year. Spring of every year. 3(3-0) P: CEM 141 or CEM 151 or CEM 181H or LB 171 R: Open to undergraduate students in the Lyman Briggs College. ~~Not open to students with credit in CEM 251.~~ Not open to students with credit in CEM 251 or CEM 351.

Common classes of organic compounds including their nomenclature, structure, bonding, reactivity, spectroscopic characterization, and the relationship of organic chemistry concepts as they are related to chemistry practices.

~~Effective Fall Semester 2020~~ Effective Spring Semester 2024

LB 273 Physics I

Fall of every year. 4(3-3) ~~P: LB 118 or MTH 132 or MTH 152H~~ P: (LB 118 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) R: Open to students in the Lyman Briggs College. ~~Not open to students with credit in PHY 183 or PHY 231 or PHY 193h or PHY 191 or PHY 251.~~ Not open to students with credit in PHY 183 or PHY 183b or PHY 231 or PHY 231c or PHY 193h or PHY 233b or PHY 221 or PHY 241 or PHY 191 or PHY 251.

Basic physics principles and problem solving techniques. Mechanical systems (Newton's laws, momentum and energy conservation, rotational motion, gravity), elementary thermodynamics, oscillations and waves, and atomic nuclei. Laboratory techniques, instrumentation, and selected experiments in classical and modern physics.

~~SA: LBS 271, LBS 271L, LBS 164~~ SA: LBS 271, LBS 271L

~~Effective Spring Semester 2014~~ Effective Spring Semester 2024

LB 274 Physics II

Spring of every year. 4(3-3) ~~P: LB 273 or PHY 183 or PHY 183B or PHY 193H or PHY 233B~~ P: (LB 273 or PHY 183 or PHY 183B or PHY 193H or PHY 221 or PHY 241) or (PHY 231 and PHY 233B) or (PHY 231C and PHY 233B) RB: LB 119 or MTH 133 or MTH 153H R: Open to students in the Lyman Briggs College. ~~Not open to students with credit in PHY 184 or PHY 232 or PHY 294h or PHY 192 or PHY 252.~~ Not open to students with credit in PHY 184 or PHY 232 or PHY 294h or PHY 192 or PHY 252 or PHY 184B or PHY 232C or PHY 234B or PHY 222 or PHY 242.

Basic physics principles and problem solving techniques. Principles of electromagnetic theory, circuits, special relativity, quantum physics, optics, atomic and subatomic physics. Laboratory error analysis and selected experiments in classical and modern physics.

~~SA: LBS 267, LBS 272, LBS 272L~~ SA: LBS 272L, LBS 272

~~Effective Spring Semester 2014~~ Effective Spring Semester 2024

LB 493 Field Experience

Fall of every year. Spring of every year. Summer of every year. ~~1 to 10 credits.~~ 1 to 12 credits. ~~A student may earn a maximum of 10 credits in all enrollments for this course.~~ A student may earn a maximum of 12 credits in all enrollments for this course. ~~R: Open to students in the Lyman Briggs College.~~ R: Open to undergraduate students in the Lyman Briggs College.

Experiential learning related to the public or private practice of science and technology.

Request the use of the Pass-No Grade (P-N) system.

Request the use of ET-Extension to postpone grading.

The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.

SA: LBS 493

~~Effective Spring Semester 2014~~ Effective Fall Semester 2023

DEPARTMENT OF MATHEMATICS

MTH 304 ~~Algebra for Elementary and Middle School Teachers~~
Algebra and Calculus for Secondary Educators
Fall of every year. 3 credits. ~~Interdepartmental with Teacher Education~~ ~~P: (MTH 201 and MTH 202 and MTH 301) and completion of Tier I writing requirement~~ P: (MTH 132 and MTH 299) and completion of Tier I writing requirement ~~R: Open to undergraduate students in the College of Education or in the Department of Teacher Education. Approval of department.~~ R: Approval of department.
~~Algebra needed for understanding connections between topics of algebra and the mathematics taught in elementary and middle school.~~ Algebra, functions and calculus needed for understanding connections between topics of collegiate math and the mathematics taught in grades 7-12.
~~Effective Fall Semester 2013~~ Effective Fall Semester 2023

MTH 305 ~~Functions and Calculus for Elementary and Middle School Teachers (W)~~
Discrete and Computational Mathematics for Secondary Educators
Spring of every year. 3(3-0) ~~Interdepartmental with Teacher Education~~ P: (MTH 304) and completion of Tier I writing requirement R: Approval of department.
~~Functions and calculus needed for understanding connections between topics of calculus and the mathematics taught in middle school.~~ Discrete and Computational mathematics needed for understanding connections between topics of collegiate math and the mathematics taught in grades 7-12.
~~Effective Fall Semester 2013~~ Effective Spring Semester 2024

MTH 458 ~~Financial Mathematics for Actuaries II~~
Computational Methods in Mathematical Finance and Insurance
Fall of every year. 3(3-0) Interdepartmental with Statistics and Probability. P: MTH 361 and STT 441 RB: MTH 235 or MTH 340 or MTH 347H
~~Evaluate and construct interest rate models. Rational valuation of derivative securities using put-call parity and calculation of European and American options. Risk management techniques using the method of delta hedging.~~ Utilize modern computational methods to price contracts in insurance and mathematical finance. Rational valuation of derivative securities using put-call parity and calculation of European and American options. Introduce hybrid contracts and features, such as equity-indexed annuities.
~~Effective Fall Semester 2015~~ Effective Fall Semester 2023

MTH 849 Partial Differential Equations
Spring of every year. 3(3-0) P: MTH 847 or approval of department ~~RB: MTH 414 and MTH 421~~ RB: MTH 828
~~Cauchy-Kowalewski theorem. Characteristics. Initial-boundary value problems for parabolic and hyperbolic equations. Energy methods, boundary value problems for elliptic equations, potential theory. Green's function, maximum principles, Schauder's method.~~ Sobolev spaces and embedding theorems, weak solutions of second order elliptic equations in divergence form (existence, uniqueness, and regularity), Fredholm alternative, maximum principle, calculus of variations, Euler-Lagrange equations.
~~Effective Fall Semester 1995~~ Effective Spring Semester 2024

MTH 935 Complex Manifolds I
~~Fall of odd years.~~ Spring of even years. 3(3-0) RB: MTH 829 and MTH 869
Riemann surfaces, Serre duality, Riemann-Roch theorem. Weierstrass points, Abel's theorem, Plucker formulas. Hermitian metrics, connections, curvature, Hodge theorem. Kaehler metrics, Kodaira vanishing theorem, Chern classes.
~~Effective Fall Semester 1995~~ Effective Spring Semester 2024

COLLEGE OF OSTEOPATHIC MEDICINE

OST 601 Transitions II: Classroom to Bedside
Summer of every year. 5 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Osteopathic Medicine.
Selected topics designed to assist the COM student in transitioning from the classroom to the clinical learning environment.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
~~Effective Summer Semester 2019~~ Effective Summer Semester 2023

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHY 862 Accelerator Systems
~~Fall of every year.~~ Spring of every year. 3(3-0) RB: PHY 422 and PHY 482 R: Open to graduate students in the College of Engineering or in the College of Natural Science.
Introduction to large accelerator systems, including the physics and engineering of accelerators and key components of accelerators.
~~Effective Summer Semester 2020~~ Effective Spring Semester 2024

PHY 983 Nuclear Astrophysics
~~Fall of every year.~~ Spring of every year. 3(3-0) RB: PHY 410 and PHY 472 and PHY 482
Low energy reaction theory, survey of astrophysics, physics of nuclei and reaction relevant to astrophysics, nuclear reaction rates in stellar environments, stellar evolution, solar neutrinos, big bang nucleosynthesis, dark matter, supernova explosions, r-process, hot CNO and rp-process, cosmochronology
~~Effective Fall Semester 2003~~ Effective Spring Semester 2024

DEPARTMENT OF PLANT, SOIL AND MICROBIAL SCIENCES

CSS 829 ~~Computational and Applied Plant Breeding~~
Advanced Plant Breeding II
Spring of odd years. 3(3-0) Interdepartmental with Horticulture. ~~P: HRT 819 and STT 814~~ P: HRT 819
Theoretical and applied methods of genetics and statistics in plant breeding; selection theory and methods; heritability; genotype-environment interaction; methods to enhance genetic progress and efficiency through statistical genetics, genomics, and marker assisted selection.
~~Effective Spring Semester 2021~~ Effective Spring Semester 2024

DEPARTMENT OF STATISTICS AND PROBABILITY

STT 200 Statistical Methods
Fall of every year. Spring of every year. Summer of every year. 3(4-0) ~~P: (MTH 102 or MTH 103 or MTH 116 or LB 117 or MTH 124 or MTH 132 or LB 118) or designated score on Mathematics Placement test~~ P: (MTH 101 or MTH 102 or MTH 103 or MTH 103B or MTH 116 or MTH 124 or MTH 132 or LB 117 or LB 118) or designated score on Mathematics Placement test R: Open to undergraduate students. Not open to students with credit in STT 201 or STT 421.
Data analysis, probability models, random variables, estimation, tests of hypotheses, confidence intervals, and simple linear regression.
~~Effective Spring Semester 2023~~ Effective Summer Semester 2023