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

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1One 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 10, 2019

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. Change the requirements for the **Bachelor of Science** degree in **Animal Science** in the Department of Animal Science.

   The concentrations in the Bachelor of Science degree in Animal Science are noted on the student’s academic record when the requirements for the degree have been completed.

   The concentration in **Production Animal Scholars** will no longer be available. Students who have not completed the requirements for this concentration by Fall 2021 will have to switch to a different concentration.

   a. Under the heading **Requirements for the Bachelor of Science Degree in Animal Science** replace the entire entry with the following:

      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 Animal Science.

      The University's Tier II writing requirement for the Animal Science major is met by completing one of the following courses: Animal Science 301, 314, or 409. Those courses are referenced in item 3. below.

      Students who are enrolled in the Animal Science major leading to the Bachelor of Science degree in the Department of Animal Science may complete an alternative track to Integrative Studies in Biological and Physical Sciences that consists of the following courses: Biological Science 161 and 171, Chemistry 141, and Chemistry 143 or 251. The completion of Biological Science 171 satisfies the laboratory requirement. Biological Science 161 and 171, Chemistry 141, and Chemistry 143 or 251 may be counted toward both the alternative track and the requirements for the major referenced in item 3. below.

      The completion of the College of Agriculture and Natural Resources mathematics requirement may also satisfy the University mathematics requirement.

      The requirements of the College of Agriculture and Natural Resources for the Bachelor of Science degree.

      Certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.

      The following requirements for the major:

      a. All of the following courses (21 credits):

      | Course | Title                                      | Credits |
      |--------|--------------------------------------------|---------|
      | ANS 101| Professional Development in Animal Science I | 1       |
      | ANS 110| Introductory Animal Agriculture             | 3       |
      | ANS 110L| Introductory Animal Agriculture Laboratory | 1       |
      | ANS 210| Introduction to Disciplines in Animal Agriculture | 3 |
      | ANS 301| Professional Development in Animal Science II (W) | 3 |
      | ANS 401| Issues in Animal Agriculture                | 1       |
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

BS 161  Cell and Molecular Biology 3
BS 171  Cell and Molecular Biology Laboratory 2
CEM 141  General Chemistry 4

b. One of the following courses (3 or 4 credits):
   STT 200  Statistical Methods 3
   STT 201  Statistical Methods 4
   STT 231  Statistics for Scientists 3
   STT 421  Statistics I 3
   STT 464  Statistics for Biologists 3

c. One of the following courses (3 or 4 credits):
   CEM 143  Survey of Organic Chemistry 4
   CEM 251  Organic Chemistry I 3

d. Two of the following introductory species management courses (6 credits):
   ANS 201  Animal Products 3
   ANS 222  Introductory Beef Cattle Management 3
   ANS 232  Introductory Dairy Cattle Management 3
   ANS 242  Introductory Horse Management 3
   ANS 252  Introduction to Management of Avian Species 3
   ANS 262  Introductory Sheep Management 3
   ANS 272  Introductory Swine Management 3
   ANS 282  Companion Animal Biology and Management 3

e. A minimum of 14 credits from the following introductory discipline courses: (14 to 16 credits):
   ANS 305  Applied Animal Behavior 3
   ANS 305L  Applied Animal Behavior Laboratory 1
   ANS 307  Animal Reproduction 3
   ANS 309  Animal Health and Disease Management 3
   ANS 313  Principles of Animal Feeding and Nutrition (W) 4
   ANS 314  Genetic Improvement of Domestic Animals 4
   ANS 315  Anatomy and Physiology of Farm Animals 4
   ANS 407  Food and Animal Toxicology 3

f. One of the following advanced management courses (3 credits):
   ANS 422  Advanced Beef Cattle Feedlot Management 3
   ANS 432  Advanced Dairy Cattle Management 3
   ANS 442  Advanced Horse Management 3
   ANS 472  Advanced Swine Management 3
   ANS 482  Advanced Companion Animal Management 3
   FSC 432  Food Processing: Dairy Foods 3
   FSC 433  Food Processing: Muscle Foods 3

g. A minimum of 2 credits in experiential learning (2 to 6 credits):
   ANS 300A  Advanced Livestock Judging 2
   ANS 300C  Advanced Dairy Cattle Judging 2
   ANS 300D  Advanced Horse Judging 2
   ANS 300E  Animal Welfare Judging 2
   ANS 300F  Advanced Dairy Farm Evaluation 2
   ANS 480  Animal Systems in International Development 3
   ANS 492  Undergraduate Research in Animal Science 3
   ANS 493  Professional Internship in Animal Science 3

A minimum of 2 credits in a department-approved Education Abroad program. 2 to 6

h. One of the following concentrations (23 to 33 credits):
   **Animal Industry** (20 to 23 credits):
   1. Both of the following course (5 credits):
      ANS 201  Animal Products 3
      CSS 110  Computer Applications in Agronomy 2
      ANS 201 may not be used to fulfill requirement 3. d. above.
   2. One of the following courses (3 credits):
      ABM 100  Decision-making in the Agri-Food System 3
      ABM 130  Farm Management I 3
   3. One of the following advanced management courses (3 credits):
      ANS 422  Advanced Beef Cattle Feedlot Management 3
      ANS 432  Advanced Dairy Cattle Management 3
      ANS 442  Advanced Horse Management 3
      ANS 472  Advanced Swine Management 3
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

Animal Biology and Pre-veterinary (32 to 39 credits):
1. All of the following courses (11 credits):
   - BS 162 Organismal and Population Biology 3
   - BS 172 Organismal and Population Biology 2
   - CEM 161 Chemistry Laboratory I 1
   - CEM 252 Organic Chemistry II 3
   - CEM 255 Organic Chemistry Laboratory 2
2. One of the following courses (4 credits):
   - BMB 200 Introduction to Biochemistry 4
   - BMB 401 Comprehensive Biochemistry 4
3. A minimum of 9 credits from the following courses (9 to 12 credits):
   - ANS 404 Introduction to Quantitative Genetics 3
   - ANS 409 Problems, Controversies and Advancements in Reproduction (W) 4
4. A minimum of 8 credits from the following courses (8 to 12 credits):
   - IBIO 313 Animal Behavior 3
   - IBIO 341 Fundamental Genetics 4
   - MMG 301 Introductory Microbiology 3
   - MMG 302 Introductory Laboratory for General and Allied Health Microbiology 1
   - MMG 409 Eukaryotic Cell Biology 3
   - PHM 450 Introduction to Chemical Toxicology 3
   - 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

Companion and Exotic Animal Biology (30 to 33 credits):
1. All of the following courses (17 credits):
   - ANS 482 Advanced Companion Animal Management 3
   - BS 162 Organismal and Population Biology 3
   - BS 172 Organismal and Population Biology Laboratory 2
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

CEM  252  Organic Chemistry II     3  
CEM  255  Organic Chemistry Laboratory     2  
IBIO  328  Comparative Anatomy and Biology of Vertebrates     4  

ANS 482 cannot be used to fulfill requirement 3. f. above.

2.  One of the following courses (4 credits):
   BMB  200  Introduction to Biochemistry     4  
   BMB  401  Comprehensive Biochemistry     4  

3.  A minimum of 9 credits from the following courses (9 to 12 credits):
   ANS  305  Applied Animal Behavior     3  
   ANS  305L  Applied Animal Behavior Laboratory     1  
   ANS  307  Animal Reproduction     3  
   ANS  309  Animal Health and Disease Management     3  
   ANS  313  Principles of Animal Feeding and Nutrition (W)     4  
   ANS  314  Genetic Improvement of Domestic Animals     4  
   ANS  315  Anatomy and Physiology of Farm Animals     4  
   ANS  404  Introduction to Quantitative Genetics     3  
   ANS  407  Food and Animal Toxicology     3  
   ANS  409  Problems, Controversies and Advancements in Reproduction (W)     4  
   ANS  413  Non-Ruminant Nutrition     4  
   ANS  418  Animal Agriculture and the Environment     3  
   ANS  425  Animal Biotechnology     3  
   ANS  427  Environmental Toxicology and Society     3  
   ANS  435  Mammary Physiology     4  
   ANS  445  Equine Exercise Physiology     4  
   ANS  455  Avian Physiology     4  
   ANS  483  Ruminant Nutrition     3  
   IBIO  313  Animal Behavior     3  
   IBIO  341  Fundamental Genetics     4  
   IBIO  355  Ecology     3  
   IBIO  369  Introduction to Zoo and Aquarium Science     3  

Courses used to fulfill this requirement may not be used to fulfill requirement 3. e. above.

Effective Fall 2020.

2.  Change the requirements for the Bachelor of Science degree in Nutritional Sciences in the Department of Food Science and Human Nutrition.

The concentrations in the Bachelor of Science degree in Nutritional Sciences are noted on the student’s academic record when the requirements for the degree have been completed.

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

   (1)  In item 3. b. under the Biomedical and Molecular Nutrition concentration, make the following changes:

   (a)  In item (7) delete the following course:

   IBIO  408  Histology     4  

   Add the following courses:

   IBIO  450  Cancer Biology (W)     3  
   MMG  451  Immunology     3  
   PHL  344  Ethical Issues in Healthcare     4  
   PSY  333  The Neurobiology of Food Intake and Overeating     3  

Courses used to fulfill this requirement may not be used to fulfill requirement 3. e. above.
(2) In item 3. b. under the **Global Nutrition and Health** concentration, make the following changes:

(a) Change the total credits from ‘42 to 47’ to ‘42 to 49’.

(b) In item (1) change the credits from ‘23’ to ‘17’ and delete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSUS 215</td>
<td>3</td>
</tr>
<tr>
<td>SOC 362</td>
<td>3</td>
</tr>
</tbody>
</table>

(c) In item (3) change the credits from ‘2 to 3’ to ‘2 or 3’ and delete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANP 370 Culture, Health, and Illness</td>
<td>3</td>
</tr>
<tr>
<td>COM 391 Topics in Verbal, Intercultural, or Gender Communication</td>
<td>4</td>
</tr>
<tr>
<td>GSAH 230 Values, Experience, and Difference in Global Contexts</td>
<td>3</td>
</tr>
</tbody>
</table>

(d) Renumber item (7) to item (8) and replace with the following:

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANP 270 Women and Health: Anthropological and International Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>ANP 370 Culture, Health, and Illness</td>
<td>3</td>
</tr>
<tr>
<td>CSS 431 International Agricultural Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSUS 215 International Development and Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>CSUS 463 Food Fight: Politics of Food</td>
<td>3</td>
</tr>
<tr>
<td>EEM 260 World Food Population and Poverty</td>
<td>3</td>
</tr>
<tr>
<td>GEO 235 Geography of Environment and Health</td>
<td>3</td>
</tr>
<tr>
<td>GEO 435 Geography of Health and Disease</td>
<td>3</td>
</tr>
<tr>
<td>GLG 446 Ecosystems Modeling, Water and Food Security</td>
<td>3</td>
</tr>
<tr>
<td>GSAH 230 Values, Experience, and Difference in Global Contexts</td>
<td>3</td>
</tr>
<tr>
<td>MC 337 Global Public Health</td>
<td>4</td>
</tr>
<tr>
<td>MC 430 Applied International Development</td>
<td>4</td>
</tr>
<tr>
<td>PHL 452 Ethics and Development</td>
<td>3</td>
</tr>
<tr>
<td>PHL 453 Ethical Issues in Global Public Health</td>
<td>3</td>
</tr>
<tr>
<td>SOC 161 International Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>SOC 362 Developing Societies</td>
<td>3</td>
</tr>
</tbody>
</table>

A course used to fulfill requirement (7) in this concentration may not be used to fulfill this requirement.

(e) Add the following item (7):

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSUS 215 International Development and Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>MC 430 Applied International Development</td>
<td>4</td>
</tr>
<tr>
<td>SOC 161 International Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>SOC 362 Developing Societies</td>
<td>3</td>
</tr>
</tbody>
</table>

(3) In item 3. b. under the **Public Health Nutrition** concentration, make the following changes:

(a) Change the total credits from ‘40 to 43’ to ‘40 to 44’.

(b) In item (5) change the total credits from ‘6 or 7’ to ‘6 to 8’ and delete the following course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPI 240</td>
<td>3</td>
</tr>
<tr>
<td>EPI 430</td>
<td>4</td>
</tr>
<tr>
<td>EPI 453</td>
<td>3</td>
</tr>
<tr>
<td>EPI 454</td>
<td>3</td>
</tr>
<tr>
<td>EPI 460</td>
<td>3</td>
</tr>
</tbody>
</table>

A course used to fulfill requirement (7) in this concentration may not be used to fulfill this requirement.
Add the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSUS 463</td>
<td>Food Fight: Politics of Food</td>
<td>3</td>
</tr>
<tr>
<td>MC 337</td>
<td>Global Public Health</td>
<td>4</td>
</tr>
</tbody>
</table>

Effective Fall 2019.

3. Change the requirements of the Bachelor of Science degree in Packaging in the School of Packaging.

The concentrations in the Bachelor of Science degree in Packaging are noted on the student’s academic record when the requirements for the degree have been completed.

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

   (1) Replace item 1., paragraph two, with the following:

   The University’s Tier II writing requirement for the Packaging major is met by completing Packaging 485. That course is referenced in item 3. below.

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

   (a) Change the total credits from ‘57’ to ‘55’.

   (b) Delete the following courses:

       | Course Code | Course Title                  | Credits |
       |-------------|-------------------------------|---------|
       | PKG 485     | Packaging Development         | 3       |
       | PKG 486     | Packaging Senior Capstone (W) | 3       |

Add the following course:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKG 485</td>
<td>Packaging Development (W)</td>
<td>4</td>
</tr>
</tbody>
</table>

Effective Summer 2020.

COLLEGE OF ARTS AND LETTERS

1. Change the requirements for the Minor in Creative Writing in the Department of English. The University Committee on Undergraduate Education (UCUE) approved this request at its meeting on April 25, 2019.

a. Add the following Admission section:

Admission

Students who are interested in the minor are eligible to apply if:

1. they have attained sophomore standing (at least 28 credits).
2. have completed the introductory course requirement (ENG 210, ENG 226, or FLM 230 if in screenwriting track).

To apply, students must:

1. submit a creative writing sample.
2. submit an application packet available online at the program website [http://www.english.msu.edu/undergraduate/program-options/creative-writing/](http://www.english.msu.edu/undergraduate/program-options/creative-writing/) or through the Department of English.
Applications are due January 30 of each year. Applications will be reviewed prior to annual enrollment.

b. Under the heading Requirements for the Minor in Creative Writing replace the entire entry with the following:

Students must complete a minimum of 17 credits from the following:

1. One of the following introductory courses (3 or 4 credits):
   - ENG 210 Foundations of Literary Study I  
   - ENG 226 Introduction to Creative Writing  
   - FLM 230 Introduction to Film  
   
   Students who choose the Script Writing for Stage and Screen track below must complete FLM 230 to fulfill this requirement.

2. Both of the following core courses (5 credits):
   - ENG 200 Creative Writing Community  
   - ENG 320D Methodologies in Literary History: History and Theory of Creative Writing

3. One of the following tracks in a single genre (9 credits):
   - Creative Nonfiction Writing
     - ENG 223 Introduction to Creative Non-Fiction Writing  
     - ENG 323 Readings in Nonfiction  
     - ENG 423 Advanced Creative Nonfiction Writing
   - Fiction Writing
     - ENG 228 Introduction to Fiction Writing  
     - ENG 328 Readings in Novel and Narrative  
     - ENG 428 Advanced Fiction Writing
   - Poetry Writing
     - ENG 229 Introduction to Poetry Writing  
     - ENG 329 Readings in Poetry and Poetics  
     - ENG 429 Advanced Poetry Writing
   - Script Writing for Stage and Screen
     - ENG 227 Introduction to Playwriting  
     - ENG 326 Readings in Drama and Performance  
     - FLM 334 Introduction to Screenwriting (W)

Effective Summer 2019.

**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 15, 2019 meeting.

   a. Under the heading Admission replace the entire entry with the following:

   To be considered for admission to the Master of Arts degree program in health and risk communication, an applicant must have a bachelor’s degree from an approved institution and a grade-point average of 3.0 in the last two years of undergraduate study. Students must submit:

   1. an academic statement of purpose outlining academic and professional goals.
   2. a personal statement, including background and life experiences, social, economic, cultural, familial, education, or other challenges or opportunities that motivated the decision to pursue graduate study.
   3. two letters of reference from persons who are familiar with the applicant’s academic and professional work.
   4. the Graduate Record Examination General Test scores.
   5. for international applicants only, the Test of English Language Fluency (TOEFL).
   6. one transcript from each college and university attended.

   Application materials should be received by April 1.
For additional information please visit our Web site at https://comartsci.msu.edu/academics/academic-departments/masters-health-risk-communication.

b. Under the heading Requirements for the Master of Arts Degree in Health and Risk Communication replace the entire entry with the following:

The program is available under Plan A (with thesis) or Plan B (without thesis), and a total of 33 credits is required for the degree. The student must meet the requirements specified below:

CREDITS

1. All of the following courses (9 credits):
   - CAS 825 Mass Communication and Public Health 3
   - CAS 826 Health Communication for Diverse Populations 3
   - EPI 810 Introductory Epidemiology 3

2. The following course (3 credits):
   - COM 803 Introduction to Quantitative Research Methods 3

3. One of the following courses (3 credits):
   - ADV 860 Media Relations 3
   - JRN 873 Environment, Science and Health Journalism Seminars 3

4. The following course (3 credits):
   - COM 893 Practicum 3

Additional Requirements for Plan A

1. The following courses (7 credits):
   - CAS 899 Master’s Thesis Research 4
   - COM 830 Applied Communication Research II 3

2. Electives (8 credits). Additional credits in courses related to health communication that have been approved by the student’s academic advisor.

3. Pass a thesis examination defense during the final semester.

Additional Requirements for Plan B

1. Electives (15 credits). Additional credits in courses related to health communication that have been approved by the student’s academic advisor.

2. Pass a written comprehensive examination during the final semester.

Effective Fall 2019.

2. Establish a Minor in Media Photography in the School of Journalism. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 7, 2019 meeting.

a. Background Information:

The Minor in Media Photography will attract students who want to pursue significant experience that they can connect to their major field of study. It consists of 15 credits of course work that instill theory and practice and spans traditional to innovative techniques. It is unique from other MSU programs because it focuses on creating images for personal pleasure, community engagement, and media consumption and distribution through communication channels and needs. When students have completed the Minor, they will understand how to use powerful images to enhance whatever field they decide to engage in across all types of distribution platforms. As the world becomes increasingly connected through images, the need to understand and to create effective photographs for any career or field of interest, whether for documentation or communication, are integral to success. Students across the MSU campus who are enrolled in a major program could benefit greatly from photography and visual communication courses that provide a foundation for visual literacy, stimulate critical thinking and analysis, and impart knowledge on how to effectively create images which can be used in a multitude of ways while they are pursuing academic degrees, as well as for their future careers. The School of Journalism has been offering courses in photography for more than 80 years, which are very popular, and would like to gather these courses into a formal minor program that can be offered to a larger pool of students. The Minor in Media Photography is unique from other MSU programs because it focuses on creating images for
media consumption and distribution through digital and print platforms, advertising content, public relations materials and overall communication needs.

The School of Journalism has offered regular photography courses that predate the 1940s, as well as a successful Photography Education Abroad experience annually since the 1980s. It is appropriate to offer the Minor in the School of Journalism because photographic images tell a story, engage audiences and communicate news and information in many forms. MSU’s Journalism program has a well-established and award-winning visual communication and media program taught by internationally-known professionals and scholars with robust connections throughout a variety of international media-related industries: journalism, advertising, broadcast, public relations, communications and many more. These high-profile faculty members are experts in the field of media production and research and can effectively lead students enrolled in the Minor in Media Photography to understand the why’s and how’s around creating powerful visual content for a multitude of uses. They employ communication theory and message systems as they consider messages, audiences, transmission processes, media production and intervening variables. The School of Journalism is positioned as a top-tier journalism program in the local market, nationally and globally. The promotion of this Minor will attract new enrollments to MSU.

b. **Academic Programs Catalog Text:**

The Minor in Media Photography, which is administered by the School of Journalism, provides the opportunity to gain extended knowledge around the history, approaches, tools, outlets and possibilities for creating engaging visual content that can be used in a variety of media outlets. Students will gain the marketable skills necessary to analyze, conceive of, create and distribute powerful images, as well as have a clear understanding of how they can use photography to support their career objectives.

The minor is available as an elective to students enrolled in bachelor’s degree programs at Michigan State University. With the approval of the department and college that administer the student’s degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor’s degree.

Students who plan to apply to the program should consult the undergraduate advisor in the School of Journalism.

**Requirements for the Minor in Media Photography**

Complete 15 credits from the following:

1. All of the following core courses (9 credits):
   - JRN 310 Photojournalism 3
   - JRN 345 Images and Messages 3
   - JRN 410 Advanced Photojournalism: Documentary 3

2. Complete 6 credits from the following courses:
   - CAS 110 Creative Thinking 3
   - CAS 111 Design and Layout 3
   - CAS 112 Story, Sound and Motion 3
   - JRN 203 Visual Storytelling 3
   - JRN 206 Video Storytelling with Cell Phones 3
   - JRN 336 Designing for Media 3
   - JRN 483 Photo Communication in Europe 6
   - JRN 492 Journalism Special Topics 3

Students enrolling in JRN 492 must have advisor approval to ensure appropriate content.

Effective Fall 2019.
COLLEGE OF EDUCATION

1. Change the requirements for the Master of Arts degree in Applied Behavior Analysis in the Department of Counseling, Educational Psychology and Special Education. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

   a. Under the heading Admission, in the last paragraph, replace the last two sentences with the following:

      Students will be admitted only during fall semester. Applications must be submitted by January 15th.

   b. Under the heading Requirements for the Master of Arts in Applied Behavior Analysis make the following changes:

      (1) Change the total credits required for the degree from ‘37’ to ‘38’.

      (2) In item 1., change the total credits from ‘21’ to ‘24 and add the following course:

           CEP 848 Supervision in Applied Behavior Analysis   3

      (3) Change item 3. to the following:

           The following course (4 credits):
           CEP 899 Master’s Thesis Research     4

      Effective Fall 2019.

2. Change the requirements for the Graduate Certificate in Applied Behavior Analysis in Special Education in the Department of Counseling, Educational Psychology and Special Education. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

   a. Under the heading Admission, replace the last paragraph with the following:

      The certificate requires completion of eight courses. All courses are offered online only. Students are required to have access to high-speed internet and the appropriate technologies. A student who, in the judgment of the faculty, has not completed appropriate courses in exceptional children or behavior management may be required to complete such courses in addition to the requirements below.

   b. Under the heading Requirements for the Graduate Certificate in Applied Behavior Analysis make the following changes:

      (1) Change the total credits required for the certificate from ‘9 to 19’ to ‘24’.

      (2) Change the credits of CEP 845 from ‘3 or 4’ to ‘3’.

      (3) Add the following courses:

           CEP 848 Supervision in Applied Behavior Analysis   3
           CEP 851 Concepts and Principles of Applied Behavior Analysis 3

      (4) Delete the following statement:

           Students currently enrolled in the Master of Arts Degree in Special Education pursuing an Autism Spectrum Disorder Endorsement will complete CEP 844, 845, and 846 as part of these requirements.

      Effective Fall 2019.
3. Change the requirements for the Bachelor of Science degree in Kinesiology in the Department of Kinesiology. The University Committee on Undergraduate Education (UCUE) approved this request at its April 11, 2019 meeting.

a. Under the heading Admission add ‘Kinesiology 173’ to the list of courses required for Admission.

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

1. In item 2. a. change the total credits from ‘18 to ‘21’ and add the following course:
   KIN 173 Foundations of Kinesiology 3

2. In item 2. b. change the total credits from ‘18’ to ‘15’ and delete the following course:
   KIN 173 Foundations of Kinesiology 3

3. In item 2. f. add the following course:
   KIN 496 Internship: Athletic Training-Based 3

Effective Spring 2020.

4. Change the requirements for the Master of Science degree in Sport Coaching and Leadership in the Department of Kinesiology. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

The concentrations in the Master of Science degree in Sport Coaching and Leadership will be noted on the student’s academic record when the requirements for the degree have been completed.

a. Under the heading Requirements for the Master of Science Degree in Sport Coaching and Leadership replace the entire entry with the following:

The program is available only under Plan B (without thesis) and only available online. The student must complete 30 credits distributed as follows:

1. All of the following courses (9 credits):
   KIN 852 Ethics in Sport Coaching and Leadership 1
   KIN 872 Coaching Science: Applied Research 3
   KIN 880 Sport Leadership Practicum 3
   KIN 896 Integrative Capstone in Sport Coaching and Leadership 2

2. Complete 21 credits from one of the following concentrations:
   Coaching
   1. Both of the following courses (6 credits):
      KIN 856 Physical Bases of Coaching Athletes 3
      KIN 868 Skill Development in Athletes 3
   2. Both of the following courses (6 credits):
      KIN 849 Theory and Practice of Modern Sport Leadership 3
      KIN 855 Psychosocial Bases of Coaching Athletes 3
   3. One of the following courses (3 credits):
      KIN 829 Safety and Injury Control 3
      KIN 854 Legal and Administrative Issues for Administrators and Coaches 3
   4. One of the following courses (3 credits):
      KIN 857 Promoting Positive Youth Development Through Sport 3
      KIN 865 Stages of Athlete Development 3
   5. One of the following courses (3 credits):
      KIN 815 Principles of Strength and Conditioning 3
      KIN 850 Special Topics in Sport Coaching and Leadership 3
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

Leadership

1. One of the following courses (3 credits):
   - KIN 856 Physical Bases of Coaching Athletes
   - KIN 868 Skill Development in Athletes

2. Both of the following courses (6 credits):
   - KIN 849 Theory and Practice of Modern Sport Leadership
   - KIN 855 Psychosocial Bases of Coaching Athletes

3. Both of the following courses (6 credits):
   - KIN 829 Safety and Injury Control
   - KIN 854 Legal and Administrative Issues for Administrators and Coaches

4. One of the following courses (3 credits):
   - KIN 857 Promoting Positive Youth Development Through Sport
   - KIN 865 Stages of Athlete Development

5. One of the following courses (3 credits):
   - KIN 815 Principles of Strength and Conditioning
   - KIN 850 Special Topics in Sport Coaching and Leadership
   - KIN 859 Scholastic Athletic Administration

3. Completion of a final examination or evaluation.

Effective Summer 2019.

5. Change the requirements for the Graduate Certificate in Sport Coaching and Leadership in the Department of Kinesiology. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

a. Under the heading Requirements for the Graduate Certificate in Sport Coaching and Leadership replace the entire entry with the following:

   1. The following course (1 credit):
      - KIN 852 Ethics in Sport Coaching and Leadership

   2. One course from at least three of the following areas (9 credits):
      - Physical
        - KIN 856 Physical Bases of Coaching Athletes
        - KIN 868 Skill Development in Athletes
      - Psychosocial
        - KIN 849 Theory and Practice of Modern Sport Leadership
        - KIN 855 Psychosocial Bases of Coaching Athletes
      - Legal, Safety, and Administration
        - KIN 829 Safety and Injury Control
        - KIN 854 Legal and Administrative Issues for Administrators and Coaches
      - Human Development
        - KIN 857 Promoting Positive Youth Development Through Sport
        - KIN 865 Stages of Athlete Development

Effective Summer 2019.
COLLEGE OF ENGINEERING

1. Establish a **Bachelor of Science** degree in **Computational Data Science** in the Department of Computer Science and Engineering. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 21, 2019 meeting.

   a. **Background Information:**

   Data science is an interdisciplinary field whose purpose is the extraction of actionable insights from data in its many forms. Data science employs theories and techniques drawn from various disciplines, including statistics, mathematics, computer science, and information science. Working data scientists use computational and analytical skills to do many things: to integrate, process, and interpret data from rich and diverse sources, or from large and potentially distributed data sets; to build mathematical models that can infer meaningful relationships in the data and can in turn be used for interpretation and prediction purposes; to create visualizations to aid in the understanding of their data and models; and to communicate their findings and insights to a variety of audiences so that decisions can be made and actions taken. Given the exponential increase in the size and complexity of datasets in virtually all industries, there is a rapidly growing demand for students with these skills (see, e.g., [https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century](https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century) and [https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation](https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation)).

   A practicing data scientist needs these skills to have a long and successful career and additionally must learn to think critically about the process of understanding and interpreting data. It is impractical for individual students to acquire all of the requisite skills using existing majors at Michigan State University, and a challenge to students and advisors alike is to determine the educational experiences that will be most important in maximizing their long-term job prospects. As a result, the Department of Computer Science and Engineering, working with the Departments of Statistics and Probability, and Computational Mathematics, Science and Engineering, proposes a new degree program, a Bachelor of Science in Computational Data Science. This major will provide students with an understanding of, and practical experience with, the key aspects of computer science, information science, statistics, and mathematics that are required to manipulate, analyze, and visualize large and complex datasets. The program will emphasize the algorithmic concepts necessary to build software systems for these operations. Additionally, students in this major will learn to think critically about the data and processes they are working with and to communicate their analysis and results to a variety of audiences.

   The degree program is based on courses administered by the Department of Computer Science and Engineering, the Department of Computational Mathematics, Science and Engineering, and the Department of Statistics and Probability. Due to the different needs of the student populations in the Colleges of Natural Science and Engineering, there is a plan to offer two related, but different, bachelor’s degrees – a Bachelor of Science in Computational Data Science led by the Department of Computer Science and Engineering in the College of Engineering and a Bachelor of Science in Data Science led by the Department of Computational Mathematics, Science and Engineering in the College of Natural Science. The Departments of Computer Science and Engineering, Computational Mathematics, Science and Engineering, and Statistics and Probability each have faculty with unique expertise that is required to create these degree programs and sharing core courses will ensure that all three departments have a strong stake in the success of implementing, maintaining, and improving both degree programs.

   Data science is rapidly becoming a popular program at many institutions. There are more than 100 active Data Science degree programs worldwide. Example programs include a B.S. degree in Data Analytics at Ohio State University and the B.S. and B.A. degrees in Data Science at the University of Rochester. The concept of multiple/parallel degree programs that share a common core has numerous precedents. The University of Michigan offers two B.S. degrees in Data Science, one administered by Statistics in the College of Literature, Science, and the Arts and the other administered by the Department of Electrical Engineering and Computer Science in the College of Engineering. Pennsylvania State University offers a B.S. in Data Science with specializations in Applied Data Sciences, Computational Data Sciences, and Statistical Modeling Data Sciences, each administered by a different department.

   Michigan State University is an ideal setting to create a new degree in data science. There are faculty in several departments, such as Computer Science and Engineering (CSE) and Statistics and Probability (STT), whose research expertise lie in aspects of the computational and
mathematical algorithms that are key to data science - in statistical analysis, machine learning, database systems, data mining, information retrieval, network analysis, signal processing, computer vision, and high performance computing - and MSU has been aggressively hiring faculty that apply these techniques to applications in a wide range of subject areas. This is further exemplified by the creation of the new Department of Computational Mathematics, Science and Engineering, which explicitly brings together faculty whose interests are in the algorithms and applications of computational modeling and data science techniques, as well as the Social Science Data Analytics initiative, which applies the tools of data science to topics outside of the traditional STEM fields. Additionally, several relevant courses in data science-related subjects have already been developed in these units, providing a base upon which to build a degree program.

There is significant student demand for these skills: MSU students have self-organized into an MSU Data Science student organization (see http://msudatascience.com/; this organization sees approximately 100 attendees at its events) and has been inviting speakers, hosting workshops, and distributing job postings to its members. Data Science-related elective offerings in the Department of Computer Science and Engineering are in high demand. These institutional trends support the creation of a degree in data science and ensure that the resources to maintain a thriving degree program will continue to exist far into the future.

b. Academic Programs Catalog Text:

The Bachelor of Science degree in Computational Data Science focuses on the computational foundations of data science, providing an in-depth understanding of the algorithms and data structures for storing, manipulating, visualizing, and learning from large data sets. Students in the program have unique access to a wide range of fundamental computer science courses in topics ranging from mobile application and web development to theory of computation and fundamental algorithms. Students can tailor their degree to their own unique interests and requirements, with an emphasis on computational foundations.

The Bachelor of Science degree program in Computational Data Science is accredited by the Computing Accreditation Commission of ABET, www.abet.org.

Requirements for the Bachelor of Science Degree in Computational Data Science

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 Computational Data Science.

   The University's Tier II writing requirement for the Computational Data Science major is met by completing Computational Mathematics, Science and Engineering 495, referenced in item 3. b. below.

   Students who are enrolled in the College of Engineering may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading Graduation Requirements for All Majors in the College statement.

2. The requirements of the College of Engineering 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. **Bioscience (4 to 6 credits)**

      (1) One of the following courses:

      | Course | Title                                      | Credits |
      |--------|--------------------------------------------|---------|
      | BS 161 | Cell and Molecular Biology                  | 3       |
      | ENT 205| Pests, Society and Environment              | 3       |
      | IBIO 150| Integrating Biology: From DNA to Populations| 3       |
      | MMG 141| Introductory Human Genetics                 | 3       |
      | MMG 201| Fundamentals of Microbiology                | 3       |
      | PLB 105| Plant Biology                               | 3       |
      | PSL 250| Introductory Physiology                     | 4       |
(2) One of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS 171</td>
<td>Cell and Molecular Biology Laboratory</td>
</tr>
<tr>
<td>CEM 161</td>
<td>Chemistry Laboratory I</td>
</tr>
<tr>
<td>CEM 162</td>
<td>Chemistry Laboratory II</td>
</tr>
<tr>
<td>PHY 191</td>
<td>Physics Laboratory for Scientists, I</td>
</tr>
<tr>
<td>PHY 192</td>
<td>Physics Laboratory for Scientists, II</td>
</tr>
<tr>
<td>PLB 106</td>
<td>Plant Biology Laboratory</td>
</tr>
</tbody>
</table>

b. All of the following courses (43 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSE 201</td>
<td>Introduction to Computational Modeling</td>
</tr>
<tr>
<td>CMSE 381</td>
<td>Fundamentals of Data Science Methods</td>
</tr>
<tr>
<td>CMSE 382</td>
<td>Optimization Methods in Data Science</td>
</tr>
<tr>
<td>CMSE 495</td>
<td>Experiential Learning in Data Science (W)</td>
</tr>
<tr>
<td>CSE 232</td>
<td>Introduction to Programming II</td>
</tr>
<tr>
<td>CSE 331</td>
<td>Algorithms and Data Structures</td>
</tr>
<tr>
<td>CSE 404</td>
<td>Introduction to Machine Learning</td>
</tr>
<tr>
<td>CSE 482</td>
<td>Big Data Analysis</td>
</tr>
<tr>
<td>CSE 480</td>
<td>Database Systems</td>
</tr>
<tr>
<td>MTH 314</td>
<td>Matrix Algebra with Computational Applications</td>
</tr>
<tr>
<td>STT 180</td>
<td>Introduction to Data Science</td>
</tr>
<tr>
<td>STT 380</td>
<td>Probability and Statistics for Data Science</td>
</tr>
</tbody>
</table>

c. Two courses selected from the following (6 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 402</td>
<td>Biometrics and Pattern Recognition</td>
</tr>
<tr>
<td>CSE 415</td>
<td>Introduction to Parallel Computing</td>
</tr>
<tr>
<td>CSE 431</td>
<td>Algorithm Engineering</td>
</tr>
<tr>
<td>CSE 440</td>
<td>Introduction to Artificial Intelligence</td>
</tr>
</tbody>
</table>

Computer Science and Engineering 415 and Computational Science, Mathematics and Engineering 401 may not be used to fulfill both requirements c. and d.

d. Two courses selected from the following (6 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSE 401</td>
<td>Methods for Parallel Computing</td>
</tr>
<tr>
<td>CMSE 402</td>
<td>Visualization of Scientific Datasets</td>
</tr>
<tr>
<td>CSE 402</td>
<td>Biometrics and Pattern Recognition</td>
</tr>
<tr>
<td>CSE 415</td>
<td>Introduction to Parallel Computing</td>
</tr>
<tr>
<td>CSE 431</td>
<td>Algorithm Engineering</td>
</tr>
<tr>
<td>CSE 440</td>
<td>Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>CSE 471</td>
<td>Media Processing and Multimedia Computing</td>
</tr>
<tr>
<td>CSE 472</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>MTH 451</td>
<td>Numerical Analysis I</td>
</tr>
<tr>
<td>MTH 468</td>
<td>Predictive Analysis</td>
</tr>
<tr>
<td>STT 464</td>
<td>Statistics for Biologists</td>
</tr>
<tr>
<td>STT 465</td>
<td>Bayesian Statistical Methods</td>
</tr>
</tbody>
</table>

Computer Science and Engineering 415 and Computational Science, Mathematics and Engineering 401 may not be used to fulfill both requirements c. and d.

Effective Fall 2019.
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF NATURAL SCIENCE

1. Change the Graduation Requirements for the Bachelor of Arts and Bachelor of Science degrees in the College of Natural Science. The University Committee on Undergraduate Education approved this request at its April 11, 2019 meeting.

   a. Under the heading Graduation Requirements make the following change in paragraph two, following item 3.:

      (1) Replace item 2. c. with the following:

         A minimum of 30 credits in courses numbered 300 and above.

      Effective Fall 2019.

2. Establish a Bachelor of Science degree in Data Science in the Department of Computational Mathematics, Science, and Engineering. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 21, 2019 meeting.

   a. Background Information:

      Data science is an interdisciplinary field whose purpose is the extraction of actionable insights from data in its many forms. Data science employs theories and techniques drawn from various disciplines, including statistics, mathematics, computer science, and information science. Working data scientists use their computational and analytical skills to do many things: to integrate, process, and interpret data from rich and diverse sources, or from large and potentially distributed data sets; to build mathematical models that can infer meaningful relationships in the data and can in turn be used for interpretation and prediction purposes; to create visualizations to aid in the understanding of their data and models; and to communicate their findings and insights to a variety of audiences so that decisions can be made and action can be taken. Given the exponential increase in the size and complexity of datasets in virtually all industries, there is a rapidly growing demand for students with these skills (see https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century and http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation).

      A practicing data scientist needs all of the skills described above in order to have a long and successful career, and additionally must learn to think critically about the process of understanding and interpreting data. It is impractical for individual students to acquire all of these skills using existing majors at Michigan State University. A challenge to students and advisors alike is to determine the educational experiences that will be most important to maximize their long-term job prospects. As a result, the Departments of Computer Science and Engineering, Statistics and Probability, and Computational Mathematics, Science, and Engineering jointly will provide resources to create a new Bachelor of Science in Data Science. The Department of Computational Mathematics, Science, and Engineering will be the administrative unit. This major will provide students with an understanding of, and practical experience with, the key aspects of statistics, mathematics, computer science, and information science that are required to manipulate, analyze, and visualize large and complex datasets. Additionally, students in this major will learn to think critically about the data and processes they are working with and to communicate their analysis and results to a variety of audiences.

      Each of these departments have faculty with unique expertise that is required to create such a degree, and jointly managing the program will ensure that all three departments have a strong stake in the success of implementing, maintaining, and improving the degree program. Due to the different needs of the student populations in the Colleges of Natural Science and Engineering, MSU plans to offer two related, but different, bachelor’s degrees - one led by the Department of Computational Mathematics, Science, and Engineering in the College of Natural Science, and the other led by the Department of Computer Science and Engineering in the College of Engineering.

      Michigan State University is an ideal setting to create a new degree in data science. With key faculty in across departments whose research expertise is in aspects of the computational and mathematical algorithms that are key to data science - in statistical analysis, machine learning,
database systems, data mining, information retrieval, network analysis, signal processing, computer vision, and high performance computing - MSU has been aggressively hiring faculty that apply these techniques to applications in a wide range of subject areas. This is further exemplified by the creation of the new Department of Computational Mathematics, Science, and Engineering (CMSE), which explicitly brings together faculty whose interests are in the algorithms and applications of computational modeling and data science techniques, as well as the Social Science Data Analytics initiative, which applies the tools of data science to topics outside of the traditional STEM fields. Additionally, several relevant courses in data science-related subjects have already been developed in these units, providing a base upon which to build a degree program. Furthermore, there is significant student demand for these skills: MSU students have self-organized into an MSU Data Science student organization. See http://msudatascience.com/. This organization sees approximately 100 attendees at its events, and has been inviting speakers, hosting workshops, and distributing job postings to its members. These institutional trends support the creation of a degree in data science and ensure that the resources to maintain a thriving degree program will continue to exist far into the future.

A substantial number of universities have created data science degrees in the last few years. In the Big 10, Penn State, Ohio State, and the University of Michigan have all developed a Bachelor of Science degree in Data Science with learning goals and course progressions that are similar to those outlined below. Interestingly, all of these programs are collaborative efforts between multiple departments: typically some combination of computer science, electrical engineering, and/or statistics. Nationwide, there are approximately twenty bachelor programs in data science available, and a comparable number of master’s programs in data science, data analytics, or business analytics.

Broadly speaking the goals of this degree are to provide a solid foundation in the core principles, methods, and tools of data science, as well as to be able to apply these to solve important data-centric problems in a wide variety of disciplines by application of the scientific method. More specifically, a student graduating with a Bachelor’s of Science in Data Science from MSU will be able to: (1) Understand and be able to apply mathematical and statistical models and concepts to detect patterns that exist in datasets, and to draw inferences and conclusions supported by that data; (2) Understand and be able to apply computer science principles relating to algorithm analysis, software design, data representation and retrieval, and programming; (3) Demonstrate critical thinking skills associated with the concepts and practices described above by using the scientific methods to reason effectively with data to identify and solve problems, to inform decision making, and to generate a logical synthesis of information from disparate sources of data; and (4) Clearly communicate their findings and the implications of those findings both orally and in writing, and to do so effectively in a variety of organizational contexts.

b. Academic Programs Catalog Text:

The Bachelor of Science degree in Data Science is designed to provide students with a strong background in data science using a broad range of computational techniques, practice in statistical thinking, as well as in-depth exposure to topics in data science.

Requirements for the Bachelor of Science Degree in Data Science

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 Data Science.

   The University’s Tier II writing requirement for the Data Science major is met by completing Computational Mathematics, Science and Engineering 495, referenced in item 3, below.

2. The requirements of the College of Natural Science for the Bachelor of Science degree.

3. The following requirements for the major:

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

   (1)  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

   (2)  CEM 142 General and Inorganic Chemistry 3
       CEM 152 Principles of Chemistry 3
       CEM 182H Honors Chemistry II 4
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

LB  172 Principles of Chemistry II  3
(3)  CEM  161 Chemistry Laboratory I  1
CEM  185H Honors Chemistry Laboratory I  2
LB  171L Introductory Chemistry Laboratory I  1

b. One course from each of the following groups (8 credits):
(1)  LB  273 Physics I  4
     PHY  183 Physics for Scientists and Engineers I  4
(2)  LB  274 Physics II  4
     PHY  184 Physics for Scientists and Engineers II  4

c. One course from each of the following groups (14 or 15 credits):
(1)  LB  118 Calculus I  4
     MTH  132 Calculus I  3
     MTH  152H Honors Calculus I  3
(2)  LB  119 Calculus II  4
     MTH  133 Calculus II  4
     MTH  153H Honors Calculus II  4
(3)  LB  220 Calculus III  4
     MTH  234 Multivariable Calculus  4
     MTH  254H Honors Multivariable Calculus  4
(4)  MTH  314 Matrix Algebra with Computational Applications  3

d. One of the following groups (4 or 6 credits):
(1)  STT  380 Probability and Statistics for Data Science  4
(2)  STT  441 Probability and Statistics I: Probability  3
     STT  442 Probability and Statistics I: Statistics  3

e. All of the following courses (31 credits):
CMSE  201 Introduction to Computational Modeling and Data Analysis  4
CMSE  202 Computational Modeling Tools and Techniques  4
CMSE  381 Fundamentals of Data Science Methods  4
CMSE  382 Optimization Methods in Data Science  4
CMSE  495 Experiential Learning in Data Science (W)  4
CSE  232 Introduction to Programming II  4
CSE  331 Algorithms and Data Structures  3
STT  180 Introduction to Data Science  4

f. A minimum of 12 credits of approved 400-level courses or above. The following courses are eligible to fulfill this requirement. Other may be substituted with advisor approval.
CMSE  401 Methods for Parallel Computing  4
CMSE  402 Data Visualization Principles and Techniques  3
CMSE  410 Computational Biology and Bioinformatics  3
CMSE  411 Computational Medicine  3
CMSE  492 Special Topics in Data Science  1 to 4
CSE  402 Biometrics and Pattern Recognition  3
CSE  440 Introduction to Artificial Intelligence  3
CSE  480 Database Systems  3
CSE  482 Big Data Analysis  3
MTH  468 Predictive Analytics  3
STT  464 Statistics for Biologists  3
STT  465 Bayesian Statistical Methods  3

A maximum of 12 credits may count towards the degree for enrollments in CMSE 492 with advisor approval.

Effective Fall 2019.
3. Establish a **Minor in Data Science** in the Department of Computational Mathematics, Science, and Engineering. The University Committee on Undergraduate Education (UCUE) recommended approval of this request at its February 21, 2019 meeting.

   a. **Background Information:**

   Data science is an interdisciplinary field whose purpose is the extraction of actionable insights from data in its many forms. Data science employs theories and techniques drawn from various disciplines, including statistics, mathematics, computer science, and information science. Working data scientists use their computational and analytical skills to do many things: to integrate, process, and interpret data from rich and diverse sources, or from large and potentially distributed data sets; to build mathematical models that can infer meaningful relationships in the data and can in turn be used for interpretation and prediction purposes; to create visualizations to aid in the understanding of their data and models; and to communicate their findings and insights to a variety of audiences so that decisions can be made and action can be taken. Given the exponential increase in the size and complexity of datasets in virtually all industries, there is a rapidly growing demand for students with these skills (see [https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century](https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century) and [http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation](http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation)).

   A practicing data scientist needs all of the skills described above in order to have a long and successful career, and additionally must learn to think critically about the process of understanding and interpreting data. It is impractical for individual students to acquire all of these skills using existing minors at Michigan State University. A challenge to students and advisors alike is to determine the educational experiences that will be most important to maximize their long-term job prospects. As a result, the Department of Statistics and Probability, and Computational Mathematics, Science, and Engineering jointly will provide resources to create a new Minor in Data Science. The Department of Computational Mathematics, Science, and Engineering will be the administrative unit. This minor will provide students with an understanding of, and practical experience with, the key aspects of statistics, mathematics, computer science, and information science that are required to manipulate, analyze, and visualize large and complex datasets. Additionally, students in this minor will learn to think critically about the data and processes they are working with and to communicate their analysis and results to a variety of audiences.

   Each of these departments have faculty with unique expertise that is required to create such the minor, and jointly managing the program will ensure that both departments have a strong stake in the success of implementing, maintaining, and improving the program.

   Michigan State University is an ideal setting to create a minor in data science. With key faculty in across departments whose research expertise is in aspects of the computational and mathematical algorithms that are key to data science - in statistical analysis, machine learning, database systems, data mining, information retrieval, network analysis, signal processing, computer vision, and high performance computing - MSU has been aggressively hiring faculty that apply these techniques to applications in a wide range of subject areas. This is further exemplified by the creation of the new Department of Computational Mathematics, Science, and Engineering (CMSE), which explicitly brings together faculty whose interests are in the algorithms and applications of computational modeling and data science techniques, as well as the Social Science Data Analytics initiative, which applies the tools of data science to topics outside of the traditional STEM fields. Additionally, several relevant courses in data science-related subjects have already been developed in these units, providing a base upon which to build a degree program. Furthermore, there is significant student demand for these skills: MSU students have self-organized into an MSU Data Science student organization. See [http://msudatascience.com/](http://msudatascience.com/). This organization sees approximately 100 attendees at its events, and has been inviting speakers, hosting workshops, and distributing job postings to its members. These institutional trends support the creation of a degree in data science and ensure that the resources to maintain a thriving degree program will continue to exist far into the future.

   A substantial number of universities have created data science degrees in the last few years. In the Big 10, Penn State, Ohio State, and the University of Michigan have all developed a Bachelor of Science degree in Data Science with learning goals and course progressions that are similar to those outlined below. Interestingly, all of these programs are collaborative efforts between multiple departments: typically some combination of computer science, electrical engineering, and/or statistics. Nationwide, there are approximately twenty bachelor programs in data science available,
and a comparable number of master's programs in data science, data analytics, or business analytics. Many of these programs also offer minors.

Broadly speaking the goals are to provide a solid foundation in the core principles, methods, and tools of data science, as well as to be able to apply these to solve important data-centric problems in a wide variety of disciplines by application of the scientific method. More specifically, a student graduating with a Minor in Data Science from MSU will be able to: (1) Understand and be able to apply mathematical and statistical models and concepts to detect patterns that exist in datasets, and to draw inferences and conclusions supported by that data; (2) Understand and be able to apply computer science principles relating to algorithm analysis, software design, data representation and retrieval, and programming; (3) Demonstrate critical thinking skills associated with the concepts and practices described above by using the scientific methods to reason effectively with data to identify and solve problems, to inform decision making, and to generate a logical synthesis of information from disparate sources of data; and (4) Clearly communicate their findings and the implications of those findings both orally and in writing, and to do so effectively in a variety of organizational contexts.

b. Academic Programs Catalog Text:

The Minor in Data Science, which is administered by the Department of Computational Mathematics, Science, and Engineering, is designed to provide students with a strong background in data science using a broad range of computational techniques, practice in statistical thinking, as well as in-depth exposure to topics in data science.

The minor is available as an elective to students enrolled in bachelor’s degree programs at Michigan State University with the exception of the Bachelor of Science degree in Data Science and the Bachelor of Science Degree in Computational Data Science. With the approval of the department and college that administer the student’s degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor’s degree.

Students who plan to apply to the program should consult the undergraduate advisor in the Department of Computational Mathematics, Science, and Engineering.

Requirements for the Minor in Data Science

Complete a minimum of 23 credits from the following:

1. All of the following courses (19 credits):

<table>
<thead>
<tr>
<th>COURSE</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSE 180 Introduction to Data Science</td>
<td>4</td>
</tr>
<tr>
<td>CMSE 201 Introduction to Computational Modeling and Data Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CMSE 202 Computational Modeling Tools and Techniques</td>
<td>4</td>
</tr>
<tr>
<td>CMSE 381 Fundamentals of Data Science Methods</td>
<td>4</td>
</tr>
<tr>
<td>MTH 314 Matrix Algebra with Computational Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

2. One of the following groups (4 or 6 credits):

   (a) STT 380 Probability and Statistics for Data Science | 4 |
   (b) STT 441 Probability and Statistics I: Probability | 3 |
   (c) STT 442 Probability and Statistics I: Statistics | 3 |

Effective Fall 2019.
COLLEGE OF NURSING

1. Change the requirements for the Master of Science in Nursing degree in Nursing. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

The concentrations in the Master of Science in Nursing degree in Nursing are noted on the student’s academic record when the requirements for the degree have been completed.

a. Under the heading Admission make the following changes:
   (1) In item 8., add the following second sentence:
       Recommendations for admission are made by the faculty committee to the Dean of the college based on the requirements for admission and the personal interview.

b. Under the heading Requirements for the Master of Science in Nursing Degree in Nursing make the following changes:
   (1) Change the total credits required from ‘45 to 48’ to ‘54’
   (2) In item 1., add the following courses:
       NUR  903 Healthcare Informatics     3
       NUR  904 Health Policy and Advocacy    3
       NUR  906 Leadership in Complex Health Systems 3
   (3) Add the following concentration:
       NURSE PRACTITIONER – PSYCHIATRIC MENTAL HEALTH (30 credits)
       EPI  840  Clinical Epidemiology for Healthcare Practice   3
       NUR  952 Psychopharmacology and Neuropathological Basis of Mental Illness 3
       NUR  953 Clinical Diagnosis and Management I – Psychiatric Assessment and Diagnosis 6
       NUR  954 Clinical Diagnosis and Management II – Evidence Based Therapeutic Interventions 6
       NUR  955 Clinical Diagnosis and Management III – Special Populations and Group 6
       NUR  956 Clinical Diagnosis and Management IV – Complex and Collaborative Mental Health Care 6
   (4) In the ADULT-GERONTOLOGY CLINICAL NURSE SPECIALIST concentration make the following changes:
       (a) Change the total credits from ‘33’ to ‘30’.
       (b) Add the following course:
           EPI  840 Clinical Epidemiology for Healthcare Practice 3

Delete the following courses:

NUR  904 Health Policy and Advocacy 3
NUR  906 Leadership in Complex Health Systems 3

Effective Fall 2019.
2. Change the requirements for the Doctor of Nursing Practice degree in Nursing Practice. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

The concentrations in the Doctor of Nursing Practice degree in Nursing Practice are noted on the student’s academic record when the requirements for the degree have been completed.

a. Under the heading Requirements for the Doctor of Nursing Practice Degree in Nursing Practice make the following changes:

(1) In item 2., add the following concentration:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUR 907</td>
<td>Advanced Pathophysiology for the Advanced Practice Registered Nurse</td>
<td>3</td>
</tr>
<tr>
<td>NUR 908</td>
<td>Advanced Physical Assessment for the Advanced Practice Registered Nurse</td>
<td>3</td>
</tr>
<tr>
<td>NUR 909</td>
<td>Advanced Pharmacology for the Advanced Practice Registered Nurse</td>
<td>3</td>
</tr>
<tr>
<td>NUR 952</td>
<td>Psychopharmacology and Neuropathological Basis of Mental Illness</td>
<td>3</td>
</tr>
<tr>
<td>NUR 953</td>
<td>Clinical Diagnosis and Management I – Psychiatric Assessment and Diagnosis</td>
<td>6</td>
</tr>
<tr>
<td>NUR 954</td>
<td>Clinical Diagnosis and Management II – Evidence Based Therapeutic Interventions</td>
<td>6</td>
</tr>
<tr>
<td>NUR 955</td>
<td>Clinical Diagnosis and Management III – Special Populations and Group</td>
<td>6</td>
</tr>
<tr>
<td>NUR 956</td>
<td>Clinical Diagnosis and Management IV – Complex and Collaborative Mental Health Care</td>
<td>6</td>
</tr>
<tr>
<td>NUR 957</td>
<td>Clinical Diagnosis and Management V – Clinical Immersion – Psychiatric Mental Health</td>
<td>6</td>
</tr>
</tbody>
</table>

b. Under the section Guidance Committee, replace the paragraph with the following:

Students will receive advisement throughout the D.N.P. Project.

c. Under the heading Comprehensive Examinations change the credits for the synthesis project from ‘6’ to ‘10’.

Effective Fall 2019.

COLLEGE OF OSTEOPATHIC MEDICINE

1. Change the requirements for the Professional Program in Osteopathic Medicine leading to the Doctor of Osteopathic Medicine degree the College of Osteopathic Medicine. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

a. Under the heading Clerkship Curriculum replace the entire entry with the following:

The clinical clerkship curriculum includes 83 weeks of clinical training in community hospitals, clinics, and private practice offices affiliated with the college from across the State of Michigan.

The third year curriculum consists of 51 weeks, transition from classroom to bedside, ambulatory family medicine, ambulatory internal medicine, ambulatory or in-patient pediatrics, in-patient internal medicine, neurology, psychiatry, obstetrics/gynecology, general surgery, and emergency medicine each in 4-week blocks. In addition, anesthesia and radiology each in 2-week blocks.
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

The fourth year curriculum consists of 32 weeks. Of those 32 weeks, 12 are required to be completed within our Statewide Campus System hospitals. The remaining 20 weeks are required to be completed within either the Statewide Campus System or any institution approved by the College of Osteopathic Medicine with advanced planning and scheduling on the part of the student. Within the 32 weeks, students will be required to complete 8 weeks in a surgical field and 12 weeks in a medicine related field. A list of possible rotations for each field is available from the College of Osteopathic Medicine.

Effective Fall 2019.

COLLEGE OF SOCIAL SCIENCE

1. Change the requirements for the Master of Science degree in Forensic Science in the School of Criminal Justice. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

   a. Under the heading Requirements for the Master of Science Degree in Forensic Science make the following changes:

      (1) In item 2. delete the Forensic Biology concentration.

      (2) In item 2., change the total credits for the Forensic Anthropology concentration from ‘16’ to ‘15’.

      (3) In item 2., under the Forensic Anthropology concentration, change the credits of ANP 842 from ‘5’ to ‘4’.

      (4) Change item 3. to the following:

            Complete an additional 8 to 11 credits of electives chosen in consultation with the student’s academic advisor.

Effective Fall 2019.

2. Change the requirements for the Master of Science degree in Law Enforcement Intelligence and Analysis in the School of Criminal Justice. The University Committee on Graduate Studies (UCGS) approved this request at its April 15, 2019 meeting.

   a. Under the heading Requirements for the Master of Science Degree in Law Enforcement Intelligence and Analysis make the following changes:

      (1) In item 1. change the credits from ‘9’ to ‘12’ and delete the following course:

            CJ 887 Quantitative Methods in Criminal Justice Research 3

            Add the following courses:

            CJ 837 The Intelligence Process and Counterterrorism 3
            CJ 870 Introduction to Crime Analysis 3

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

            CJ 837 Counterterrorism and Intelligence 3
            CJ 856 Advanced Topics in Policing 3

            Add the following courses:

            CJ 871 Advanced Crime Analysis 3
PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

CJ 872 Open Source Information Analysis 3

(3) In item 3. Delete the following course:

CJ 896 Policy Analysis under Conditions of Change 3

Add the following course:

CJ 897 Comprehensive Threat Assessment 3

(4) Delete item 4. and renumber item 5. to item 4.

Effective Fall 2019
### PART II - NEW COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offered Years</th>
<th>Credits: Contact Hours</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANS 110L</td>
<td>Introductory Animal Agriculture Laboratory</td>
<td>Fall of every year. Spring of every year. 1(0-2)</td>
<td>Hands on experience in working with farm and companion animals. Field trip required.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
<tr>
<td>ANS 210</td>
<td>Introduction to Disciplines in Animal Agriculture</td>
<td>Fall of every year. Spring of every year. 3(3-0) P: ANS 110 or concurrently</td>
<td>Problem solving and literature searches with realistic examples to demonstrate multidisciplinary scientific solutions in Animal Science.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
<tr>
<td>ANS 305L</td>
<td>Applied Animal Behavior Laboratory</td>
<td>Fall of every year. 1(0-2) P: ANS 305</td>
<td>Biological basis of behavior to improve animal health, productivity and welfare.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
<tr>
<td>ANS 307</td>
<td>Animal Reproduction</td>
<td>Fall of every year. 3(3-0) P: ANS 210</td>
<td>Reproductive physiology of farm and companion animals. Comparative reproduction in human and laboratory animals.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
<tr>
<td>ANS 404</td>
<td>Introduction to Quantitative Genetics</td>
<td>Fall of every year. 3(3-0) P: (ANS 314) and (STT 200 or STT 201 or STT 231 or STT 421 or STT 464)</td>
<td>Theories and applications of quantitative genetics and their roles in breeding.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
<tr>
<td>ANS 482</td>
<td>Advanced Companion Animal Management</td>
<td>Spring of every year. 3(2-2) P: ANS 282 and ANS 210 RB: ANS 305 or IBIO 313</td>
<td>Companion animal behavior, welfare, anatomy, physiology, nutrition and health. Careers in the companion animal industry. Experiential learning projects. Field trip required.</td>
<td>Effective Spring 2020</td>
<td></td>
</tr>
</tbody>
</table>

### DEPARTMENT OF COMMUNITY SUSTAINABILITY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offered Years</th>
<th>Credits: Contact Hours</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSUS 821</td>
<td>Indigenous Peoples, Sustainability and Environmental Justice</td>
<td>Fall of even years. 3(3-0) Interdepartmental with Philosophy. R: Open to graduate students.</td>
<td>Indigenous peoples as major architects of environmental sustainability movements and environmental justice. Climate change adaptation, resilience, food sovereignty, and ecological restoration. Environmental movements, cooperative environmental and climate science, and coalitions for environmental advocacy. Case studies of Great Lakes and global Indigenous peoples in dialogue.</td>
<td>Effective Fall 2020</td>
<td></td>
</tr>
</tbody>
</table>

### DEPARTMENT OF COMPUTATIONAL MATHEMATICS, SCIENCE, AND ENGINEERING

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offered Years</th>
<th>Credits: Contact Hours</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSE 381</td>
<td>Fundamentals of Data Science Methods</td>
<td>Fall of every year. Spring of every year. 4(4-0) Interdepartmental with Statistics and Probability. P: (STT 180 and MTH 314 and CMSE 201 and STT 380) or (STT 180 and MTH 314 and CMSE 201 and STT 441 and STT 442)</td>
<td>Data science methods, including unsupervised learning and supervised learning, feature extraction, dimension reduction, clustering, regression and classification.</td>
<td>Effective Fall 2019</td>
<td></td>
</tr>
</tbody>
</table>
CMSE 382  Optimization Methods in Data Science  
Fall of every year. Spring of every year. 4(4-0) P: CMSE 202 and CMSE 381  
Concepts, mathematical foundations, methods, and algorithms of optimization in data  
modeling, all applied to modeling real-world data.  
Effective Fall 2019

CMSE 492  Selected Topics in Data Science  
Fall of every year. Spring of every year. 1 to 4 credits. Interdepartmental with Computer Science  
and Engineering and Statistics and Probability. A student may earn a maximum of 12 credits in all  
enrollments for this course. R: Approval of department.  
Topics selected to supplement and enrich existing courses in Data Science.  
Effective Fall 2019

CMSE 495  Experiential Learning in Data Science (W)  
Fall of every year. Spring of every year. 4(2-4) Interdepartmental with Computer Science and  
Engineering and Statistics and Probability. P: (CSE 232 and CMSE 382) and completion of Tier I  
writing requirement R: Open to seniors.  
Team-based data science projects on realistic, large-scale data.  
Effective Fall 2019

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

CSE 404  Introduction to Machine Learning  
Fall of every year. 3(3-0) Interdepartmental with Computational Mathematics, Science, and  
Engineering and Statistics and Probability. P: (CSE 331) and (STT 351 or STT 380 or STT 430 or  
STT 441) RB: Basic linear algebra R: Open to juniors or seniors in the College of Engineering or in  
the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the  
Lyman Briggs Computer Science Major.  
Core principles and techniques of all machine learning including model design and  
programming algorithms.  
Effective Fall 2019

**DEPARTMENT OF COUNSELING, EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION**

CEP 848  Supervision in Applied Behavior Analysis  
Summer of every year. 3(3-0) R: Open to students in the Applied Behavior Analysis Major or in the  
Applied Behavior Analysis in Special Education Graduate Certificate.  
Effective supervision strategies in behavior analytic practice.  
Effective Summer 2019

**DEPARTMENT OF FORESTRY**

FOR 804  Forest Ecology  
Fall of odd years. 3(3-0) RB: FOR 404  
REINSTATEMENT Processes controlling population, community, ecosystem, landscape, and global ecology  
of forested systems. Extrapolation across scales, succession, spatial models of forest  
dynamics, causes and consequences of biodiversity, nutrient cycling, sustainability of  
managed ecosystems and human-accelerated environmental change.  
Effective Fall 2019

**DEPARTMENT OF KINESIOLOGY**

KIN 496  Internship: Athletic Training-Based  
Fall of every year. Spring of every year. 3 credits. A student may earn a maximum of 6 credits in all  
enrollments for this course. P: KIN 125 and KIN 126 and KIN 127 R: Open to seniors in the  
Department of Kinesiology. Approval of department.  
Professional internship in Athletic Training under faculty supervision. Observation and  
prevention of athletic injury in high school and collegiate athletes.  
Effective Fall 2019
KIN 849  Theory and Practice of Modern Sport Leadership  
Spring of every year. 3(3-0) R: Open to graduate students in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major or approval of department. Theories of management and organizational behavior in a sport context. Practical strategies and methods for management, development, and advancement of sport professionals, athletes, and stakeholders. 
Effective Spring 2020

KIN 850  Special Topics in Sport Coaching and Leadership  
Fall of every year. 3(3) A student may earn a maximum of 9 credits in all enrollments for this course. R: Open to graduate students in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major or approval of department. 
Issues in sport coaching and leadership. 
Effective Summer 2019

KIN 852  Ethics in Sport Coaching and Leadership  
Spring of every year. Summer of every year. 1(1-0) R: Open to graduate students in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major or approval of department. Ethical decision-making processes and moral obligations of the sport coach and leaders. 
Effective Summer 2019

KIN 859  Scholastic Athletic Administration  
Fall of every year. 3(3-0) R: Open to graduate students in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major or approval of department. Skills to direct athletic programs in secondary educational settings. Athletic policies and guidelines of facilities, equipment, budget, and structure. 
Effective Fall 2019

MSU COLLEGE OF LAW

LAW 537V  Blockchain Technology, Law, and Policy  
Fall of every year. 0 to 6 credits. R: Open to Law students or law advanced students or law lifelong students or law non-degree students. Blockchain technology, the laws affecting applications of the technology, and anticipated effects on contemporary legal practice. 
Effective Fall 2019

LAW 566T  Marijuana Law  
Fall of every year. Spring of every year. 0 to 6 credits. R: Open to Law students or law advanced students or law lifelong students or law non-degree students. Historical and current legal developments at the state and federal levels relating to the regulation of marijuana. 
Effective Fall 2019

LAW 811B  Special Topics in Global Food Law  
Summer of odd years. 0 to 6 credits. R: Open to law advanced students. Emerging, controversial and general developments in national and international food law and policy. 
Effective Summer 2019

COLLEGE OF NURSING

NUR 952  Psychopharmacology and Neuropathological Basis of Mental Illness  
Summer of every year. 3(3-0) R: Open to graduate students or lifelong graduate students in the College of Nursing. Advanced pharmacology and psycho-pharmacotherapeutics and the putative neuropathophysiology of common psychiatric illnesses that occur across the lifespan. 
Effective Spring 2020
PART II – NEW COURSES

NUR 953  Clinical Diagnosis and Management I - Psychiatric Assessment and Diagnosis
Fall of every year. 6(3-9) P: NUR 907 and NUR 908 and NUR 909 and NUR 952 R: Open to graduate students in the College of Nursing.
Mental health assessment and diagnostic screening to formulate differential diagnoses for common mental health conditions/problems across the lifespan.
Effective Spring 2020

NUR 954  Clinical Diagnosis and Management II – Evidence-Based Therapeutic Interventions
Spring of every year. 6(3-9) P: NUR 953 R: Open to graduate students in the College of Nursing.
Assessment and intervention strategies for health promotion and common mental health problems in the clinical setting across the lifespan.
Effective Spring 2020

NUR 955  Clinical Diagnosis and Management III – Special Populations and Group
Summer of every year. 6(3-9) P: NUR 954 R: Open to graduate students in the College of Nursing.
Assessment, intervention, including group psychotherapy, and management strategies for special and vulnerable populations with mental health problems across the lifespan.
Effective Spring 2020

NUR 956  Clinical Diagnosis and Management IV – Complex and Collaborative Mental Health Care
Fall of every year. 6(2-12) P: NUR 955 R: Open to graduate students in the College of Nursing.
Evidence-based strategies to deliver collaborative mental health care across the wellness/illness continuum with patients across the lifespan.
Effective Spring 2020

NUR 957  Clinical Diagnosis and Management V – Clinical Immersion – Psychiatric Mental Health
Spring of every year. 6(2-12) P: NUR 956 R: Open to graduate students in the College of Nursing.
Evidence-based management of chronic stable and complex mental health problems within collaborative practice in complex health systems across the lifespan.
Effective Spring 2020

DEPARTMENT OF PHILOSOPHY

PHL 225  Paradoxes
Fall of every year. 3(3-0)
Central philosophical paradoxes and possible solutions. Topics vary and may include paradoxes about existence, infinity, space and time, knowledge, rationality, and truth.
Students develop solutions to paradoxes, and work out consequences and costs of those solutions.
Effective Fall 2020

DEPARTMENT OF STATISTICS AND PROBABILITY

STT 180  Introduction to Data Science
Fall of every year. Spring of every year. 4(4-0) Interdepartmental with Computational Mathematics, Science, and Engineering. P: (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)) Not open to students with credit in STT 301.
Effective Fall 2019

STT 380  Probability and Statistics for Data Science
Fall of every year. Spring of every year. 4(4-0) P: ((MTH 234 or concurrently) or (MTH 254H or concurrently) or (LB 220 or concurrently)) and (MTH 314 or concurrently)
Fundamental concepts and methods in probability and statistics from a data science perspective.
Effective Fall 2019
STT 804 Statistical Consulting and Practice  
Fall of every year. 3(3-0) R: Open to master's students in the College of Natural Science. Approval of department.

Statistical consulting and the practical aspects of the consulting environment. Ethics. Communication skills. Data management, and statistical methods. 
Effective Fall 2019
PART III – COURSE CHANGES

DEPARTMENT OF ANIMAL SCIENCE

ANS 110  Introductory Animal Agriculture
Fall of every year. Spring of every year. 4(3-2) 3(3-0) R: Open to undergraduate students or agricultural technology students.
SA: ANS 112
Effective Spring 2014 Effective Fall 2020

ANS 201  Animal Products
Fall of every year. Spring of every year. 3(3-0) RB: ANS 110 R: Not open to freshmen.
Effective Spring 2014 Effective Spring 2020

ANS 262  Introductory Sheep Management
Fall of every year. Spring of every year. 3(2-2)
Principles of sheep management: genetics, reproduction, nutrition, marketing, and economics.
Effective Fall 2013 Effective Fall 2019

ANS 301  Professional Development in Animal Science II
Professional Development in Animal Science II (W)
Fall of every year. Spring of every year. 4(4-0) R: (ANS 101 and ANS 110) and completion of Tier I writing requirement P: (ANS 110) and completion of Tier I writing requirement RB: ANS 101 R: Open to juniors or seniors in the Department of Animal Science.
Effective Fall 2013 Effective Fall 2020

ANS 305  Applied Animal Behavior
Spring of every year. Summer of every year. 3(2-2) 3(3-0) P: BS 161 or LB 145 or BS 181H P: (ANS 210) and (BS 162 or LB 144 or BS 182H)
Techniques for assessing health and welfare of domestic animals based on their behavior.
Effective Fall 2013 Effective Fall 2020

ANS 313  Principles of Animal Feeding and Nutrition
Principles of Animal Feeding and Nutrition (W)
Fall of every year. 4(3-2) P: ((BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement) and ((CEM 143 or concurrently) or (CEM 251 or concurrently))
Comparative nutrition and metabolism for production, health, and stewardship of cattle, horses, swine, poultry, dogs and cats. Diet evaluation and formulation. Feeding management.
Effective Spring 2014 Effective Fall 2020

ANS 314  Genetic Improvement of Domestic Animals
Genetic Improvement of Domestic Animals (W)
Fall of every year. Spring of every year. 4(4-0) P: ((BS 161 or BS 181H or LB 145) and completion of Tier I writing requirement) and (STT 200 or STT 201 or STT 421 or STT 464 or STT 231)
Molecular, Mendelian, population, and quantitative genetics of domestic animals.
Effective Spring 2014 Effective Fall 2020
PART III – COURSE CHANGES

ANS 315  Anatomy and Physiology of Farm Animals
Spring of every year. 4(3-2)  P: (BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement
P: BS 161 or LB 145 or BS 181H
Effective Spring 2014 Effective Fall 2020

ANS 409  Problems, Controversies and Advancements in Reproduction
Problems, Controversies and Advancements in Reproduction (W)
Fall of every year. 3(3-0) 4(4-0)  P: BS 161 or PSL 250  P: (BS 161 or PSL 250) and completion of Tier I writing requirement
RB: ANS 307
Selected topics in endocrine, cellular, molecular and genetic aspects of sex differentiation, gametogenesis, folliculogenesis, sexual cycles, behavior, fertilization, early embryo development, pregnancy, parturition, infertility, reproductive disorders, assisted reproductive technologies in humans, livestock and animal models. Selected topics in endocrine, cellular, molecular and genetic aspects of reproduction in humans, livestock and animal models.
Effective Fall 2014 Effective Fall 2020

ANS 435  Mammary Physiology
Mammary Physiology (W)
Spring of every year. 4(3-2) 3(3-0)  P: (BS 161 or LB 145 or BS 181H) and (ANS 313 and ANS 315)  P: ((BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement) and (ANS 313 and ANS 315) R: Not open to freshmen and not open to sophomores.
Effective Spring 2014 Effective Fall 2020

DEPARTMENT OF BIOSYSTEMS AND AGRICULTURAL ENGINEERING

TSM 331  Water Management in Agriculture and Food Systems
Spring of every year. 3(3-0) Interdepartmental with Crop and Soil Sciences.  P: MTH 103 or MTH 124 or MTH 132 or LB 118
Principles of water management, use efficiency and conservation in agricultural production, natural resources and food processing facilities. Best agricultural water management practices, water rights, irrigation scheduling, irrigation systems selection, evaluation and management and drainage principles. Large scale water use, management and conservation in food processing.
SA: TSM 431
Effective Fall 2015 Effective Fall 2019

SCHOOL OF PACKAGING

PKG 485  Packaging Development
Packaging Development (W)
Fall of every year. Spring of every year. 2(3-0) 4(4-0)  P: (PKG 410 and PKG 432) and (PKG 315 or EGR 102) and (PKG 411 or concurrently)  P: ((PKG 410 and PKG 432) and completion of Tier I writing requirement) and (PKG 315 or EGR 102) and (PKG 411 or concurrently) R: Open to seniors or graduate students in the School of Packaging.
Package development including selection, design and implementation of package systems for protection, distribution, merchandising, use and disposal.
Effective Fall 2014 Effective Summer 2020
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSE 331  Algorithms and Data Structures  
Fall of every year. Spring of every year. 3(3-0) P: CSE 232 and CSE 260 P: (CSE 232) and (CSE 260 or CMSE 202) R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science and Engineering Major or in the Lyman Briggs Computer Science Disciplinary Teaching Minor. R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science and Engineering Major or in the Lyman Briggs Computer Science Disciplinary Teaching Minor. 

Linear data structures, trees, graphs and algorithms which operate on them. Fundamental algorithms for searching, sorting, string matching, graph problems. Design and analysis of algorithms. 

Effective Spring 2014 Effective Fall 2019

CSE 402  Biometrics and Pattern Recognition  
Fall of every year. 3(3-0) P: CSE 331 and STT 351 P: (CSE 331) and (STT 351 or STT 380 or STT 430 or STT 441) R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science and Engineering Major or in the Lyman Briggs Computer Science Major. 

Automated techniques used for feature extraction and pattern matching focusing on face, fingerprint and iris recognition. 

Effective Fall 2017 Effective Fall 2019

CSE 415  Introduction to Parallel Computing  
Spring of every year. 3(3-0) P: CSE 320 and CSE 331 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science and Engineering Major or in the Lyman Briggs Computer Science Major. Not open to students with credit in CMSE 401. 


Effective Fall 2017 Effective Fall 2019

CSE 482  Big Data Analysis  
Spring of every year. 3(3-0) P: CSE 331 and CSE 335 and STT 351 P: (CSE 331) and (STT 351 or STT 380 or STT 430 or STT 441) R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science and Engineering Major or in the Lyman Briggs Computer Science Major. 

Data collection, storage, and preprocessing, and analysis techniques. Programming for large-scale data analysis. Case studies and applications. 

Effective Spring 2017 Effective Fall 2019

DEPARTMENT OF ECONOMICS

EC 401  Advanced Microeconomics  
Fall of every year. Spring of every year. 3(3-0) P: EC 251H or EC 301 P: (EC 251H or EC 301) and (MTH 124 or MTH 132 or MTH 152H or LB 118) 

Economics of uncertainty and incomplete information. Game theory and theories of oligopoly. Transaction costs. Advanced topics in welfare economics, general equilibrium, externalities, and public goods. 

Effective Fall 2014 Effective Fall 2019
DEPARTMENT OF EMERGENCY MEDICINE

EM 632  Senior Clinical Elective in Emergency Medicine
Fall of every year. Spring of every year. Summer of every year. 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: (EM 641 and MED 641 and PHD 641 and PSC 641 and OGR 641 and SUR 641) or (EM 608 and MED 608 and PHD 600 and PSC 608 and OGR 608 and SUR 608) R: Open to graduate-professional students in the College of Human Medicine.
Four-week elective in clinical diagnosis and treatment of the undifferentiated patient in the emergency department setting. Intended for students planning to apply to an Emergency Medicine Residency.
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 2 semesters after the end of the semester of enrollment.
Effective Fall 2018

DEPARTMENT OF ENGLISH

FLM 200  Film Collective
Fall of every year. Spring of every year. 4(1-1) 1(1-2)
Film Collective screening seminar.
Request the use of the Pass-No Grade (P-N) system.
Effective Fall 2015

SCHOOL OF HOSPITALITY BUSINESS

HB 337  Hospitality Information Systems
Fall of every year. Spring of every year. 3(3-0) P: HB 237 and CSE 101 P: (HB 237) and (CSE 101 or CSE 102) R: Open to juniors or seniors in the School of Hospitality Business.
Technology for gathering, analyzing, storing and communicating information within the hospitality industry.
Effective Spring 2013

SCHOOL OF HUMAN RESOURCES AND LABOR RELATIONS

HRLR 999  Doctoral Dissertation Research
Fall of every year. Spring of every year. Summer of every year. 1 to 6 credits, 1 to 9 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open to doctoral students or approval of school.
Doctoral dissertation research.
Request the use of the Pass-No Grade (P-N) system.
Effective Summer 2014

JAMES MADISON COLLEGE

MC 334  Rights, Advocacy, and Activism
Fall of odd years. 4(3-0) P: MC 230 and MC 231 or approval of college P: MC 230 or MC 231 or MC 280 or MC 281 or approval of college R: Open to undergraduate students in the James Madison College.
Global perspectives on human rights, non-governmental organization (NGO) advocacy, and grassroots activism as mechanisms of change. Case studies on racial and cultural discrimination, gender-based violence, sexuality and rights, environment and climate justice, refugees and immigration, and other topics.
Effective Fall 2015
DEPARTMENT OF KINSEIOLOGY

KIN 126  
Introduction to Athletic Training  
Introduction to Athletic Injury  
Fall of every year. Spring of every year. 3(3-0)  
R: Open to undergraduate students in the Athletic Training Major or in the Kinesiology major.  
R: Open to undergraduate students in the Kinesiology major.  
Basic knowledge for the recognition and prevention of athletic injuries.  
Effective Spring 2014 Effective Spring 2020

KIN 127  
Taping and Bracing in Athletic Training  
Taping and Bracing in Athletic Injury  
Fall of every year. Spring of every year. 1(0-2)  
R: Open to undergraduate students in the Department of Kinesiology.  
Introduction to taping and bracing in Athletic Training. Introduction to taping and bracing for athletic injuries.  
Effective Spring 2014 Effective Spring 2020

KIN 855  
Psychosocial Bases of Coaching Athletes  
Fall of every year. 3(3-0)  
R: Open to students in the Education Major or in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major.  
R: Open to students in the Education Major or in the Sport Coaching and Leadership Graduate Certificate or in the Sport Coaching and Leadership Major or approval of department.  
Responsibilities of athletic administrators, directors of recreational programs, and athletic coaches for the sociological, psychological, philosophical, developmental, and instructional principles for coaching amateur athletes. Development of a coaching philosophy and application of scientific findings to practical situations. Athlete motivation, motivational climates, and the social psychology of coaching and leadership. Communication skills and leadership behaviors. Mental skills that enhance an athlete’s performance.  
Effective Spring 2017 Effective Summer 2019

KIN 896  
Integrative Capstone in Sport Coaching and Leadership  
Fall of every year. Spring of every year. Summer of every year. 3(3-0)  
P: (KIN 829 or concurrently) and KIN 854 and KIN 855 and KIN 856 and KIN 857 and KIN 865 and KIN 868 and KIN 872 and KIN 880  
P: KIN 872 and KIN 880 or approval of department  
R: Open to master’s students in the Sport Coaching and Leadership Major.  
Integrative capstone in coaching science, best practices, leadership, and management in sport.  
Request the use of the Pass-No Grade (P-N) system.  
Effective Spring 2017 Effective Summer 2019

DEPARTMENT OF MEDICINE

MED 628  
Advanced Internal Medicine: Senior Medicine Sub-Internship  
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MED 608 or MED 641  
R: Open to graduate-professional students in the College of Human Medicine.  
Advanced clinical experiences to refine diagnostic and management skills in complicated general internal medicine patients.  
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 2 semesters after the end of the semester of enrollment.  
Effective Summer 2019
COLLEGE OF NURSING

NUR 434  Nursing Care of Acute and Chronically Ill Patients III
Nursing Care of Acute and Critically Ill Patients
Fall of every year. Spring of every year. 4(2-6) P: NUR 337 and NUR 371 and NUR 342
Nursing process and clinical judgment to manage and evaluate care for acute and critically ill patients at an advanced level.
Effective Fall 2019

DEPARTMENT OF SURGERY

SUR 615  Ophthalmology Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: SUR 608 or SUR 641 RB: SUR 608 or SUR 641 R: Open to graduate-professional students in the College of Human Medicine.
Medical and surgical treatment of eye diseases. Clinical experiences include private office practice, surgical observations, pre- and post-operative care.
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 2 semesters after the end of the semester of enrollment.
Effective Fall 2018 Effective Summer 2019

SUR 618  Anesthesia Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: SUR 608 or SUR 641 RB: SUR 608 or SUR 641 R: Open to graduate-professional students in the College of Human Medicine.
Common anesthetic agents and procedures. Operative and post-operative effects, complications, patient risk, cost. Performing anesthetic procedures under faculty supervision.
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 2 semesters after the end of the semester of enrollment.
Effective Fall 2018 Effective Summer 2019

SUR 630  Surgical Wound Care Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: SUR 608 or SUR 641 RB: SUR 608 or SUR 641 R: Open to graduate-professional students in the College of Human Medicine.
Evaluation, management and knowledge of wound care in surgical patients.
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 2 semesters after the end of the semester of enrollment.
Effective Fall 2018 Effective Summer 2019

SUR 632  Surgical Nutrition Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: SUR 608 or SUR 641 RB: SUR 608 or SUR 641 R: Open to graduate-professional students in the College of Human Medicine.
Evaluation, management and knowledge of nutrition in critically-ill surgical patients.
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 2 semesters after the end of the semester of enrollment.
Effective Fall 2018 Effective Summer 2019
VM 826  Creating a Food Safety Culture
Summer of odd years. 3(3-0) RB: Professional or graduate status with knowledge of food safety. R:
Open to graduate students in the College of Veterinary Medicine or in the Department of Large
Animal Clinical Sciences or in the Food Safety Major or approval of college.  R: Approval of college.
Explores proven, evidence-based ways to change or strengthen the food safety culture of
an organization and influence employee behavior.
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 2017  Effective Summer 2019