PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF NATURAL SCIENCE

1. Request to change the requirements for the Bachelor of Science degree in Human Biology in the College of Natural Science.
   a. Under the heading Requirements for the Bachelor of Science Degree in Human Biology make the following changes:
      
      (1) In item 3. b. delete the following course:
      
      NSC 495 Capstone in Human Biology (W) 3
      
      Add the following course:
      
      HBIO 495 Capstone in Human Biology (W) 3
      
      (2) In item 3. g., add the following:
      
      (7) PHY 173 Studio Physics for Scientists and Engineers I 5
      PHY 174 Studio Physics for Scientists and Engineers II 5
      
      (3) In item 3. i., add the following courses:
      
      ANP 204 Introduction to Medical Anthropology 3
      ANP 206 Introduction to Physical Anthropology 3
      ANP 425 Issues in Medical Anthropology 3
      ANP 443 Human Adaptability 3
      BLD 213L Clinical Laboratory Methods 2
      BLD 430 Molecular Diagnostics 2
      HBIO 295 Human Biology and Society 2
      
      Change the note following 3. i. to the following:
      
      With the approval of the director of the human biology major, a maximum of 3 credits in research (HBIO 498), internship (HBIO 497) or independent study (HBIO 496) courses may be used to satisfy this requirement.
      
      Courses used to fulfill requirement 3. h. may not be used to fulfill requirement 3. i.
      
      Effective Spring 2023.

2. Request to change the requirements for the Bachelor of Science degree in Neuroscience in the College of Natural Science.
   a. Under the heading Requirements for the Bachelor of Science Degree in Neuroscience make the following changes:
      
      (1) Add the following to item 3. c.:
      
      (5) PHY 221 Studio Physics for Life Scientists I 4
      PHY 222 Studio Physics for Life Scientists II 4
      
      (2) In item 3. k. under the Cellular and Developmental Neuroscience concentration delete the following courses:
      
      IBIO 343 Genetics Laboratory 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEU 425</td>
<td>Computational Modeling in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>NEU 435</td>
<td>Ion Channels of Excitable Membranes</td>
<td>3</td>
</tr>
<tr>
<td>PLB 400</td>
<td>Introduction to Bioinformatics</td>
<td>3</td>
</tr>
</tbody>
</table>

Add the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEU 417</td>
<td>Instrumental Methods of Analysis in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>NEU 450</td>
<td>The Autonomic Nervous System</td>
<td>3</td>
</tr>
<tr>
<td>NEU 460</td>
<td>Current Approaches in Molecular and Cellular Neuroscience</td>
<td>3</td>
</tr>
</tbody>
</table>

(3) In item 3. k. under the **Behavioral and Systems Neuroscience** concentration delete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBIO 403</td>
<td>Integrative Neurobiology</td>
<td>3</td>
</tr>
<tr>
<td>NEU 425</td>
<td>Computational Modeling in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>PSY 310</td>
<td>Psychology and Biology of Human Sexuality</td>
<td>3</td>
</tr>
<tr>
<td>PSY 402</td>
<td>Sensation and Perception (W)</td>
<td>3</td>
</tr>
<tr>
<td>PSY 493</td>
<td>Issues in Psychology (W)</td>
<td>3</td>
</tr>
</tbody>
</table>

Add the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBIO 405</td>
<td>Neural Basis of Animal Behavior</td>
<td>3</td>
</tr>
<tr>
<td>NEU 310</td>
<td>Psychology and Biology of Human Sexuality</td>
<td>3</td>
</tr>
<tr>
<td>NEU 417</td>
<td>Instrumental Methods of Analysis in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>NEU 440</td>
<td>Synaptic Transmission</td>
<td>3</td>
</tr>
<tr>
<td>NEU 450</td>
<td>The Autonomic Nervous System</td>
<td>3</td>
</tr>
<tr>
<td>NEU 460</td>
<td>Current Approaches in Molecular and Cellular Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>PHM 422</td>
<td>Fundamentals of Neuropharmacology</td>
<td>3</td>
</tr>
<tr>
<td>PSY 302</td>
<td>Sensation and Perception</td>
<td>3</td>
</tr>
<tr>
<td>PSY 333</td>
<td>The Neurobiology of Food Intake and Overeating</td>
<td>3</td>
</tr>
</tbody>
</table>

Remove PSY 493 from the note following.

(4) In item 3. k. under the **Cognitive and Computational Neuroscience** concentration delete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEU 425</td>
<td>Computational Modeling in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>PSL 429</td>
<td>Biomedical Imaging Methods</td>
<td>3</td>
</tr>
<tr>
<td>PSY 402</td>
<td>Sensation and Perception (W)</td>
<td>3</td>
</tr>
<tr>
<td>PSY 493</td>
<td>Issues in Psychology (W)</td>
<td>3</td>
</tr>
</tbody>
</table>

Add the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEU 417</td>
<td>Instrumental Methods of Analysis in Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>PSY 302</td>
<td>Sensation and Perception</td>
<td>3</td>
</tr>
</tbody>
</table>

Remove PSY 493 from the note following.

Effective Spring 2023.
3. Request to change the requirements for the Bachelor of Science degree in Actuarial Science in the Department of Mathematics.

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

      (1) In item 3. c., change the total credits from '8' to '8 or 10'.

      (2) In item 3. c., add the following item:

            (4) PHY 173 Studio Physics for Scientists and Engineers I  5
            PHY 174 Studio Physics for Scientists and Engineers II  5

   Effective Spring 2023.

4. Request to change the requirements for the Bachelor of Arts degree in Computational Mathematics in the Department of Mathematics.

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

      (1) In item 3. a., change the total credits from '21' to '19 or 20'.

      (2) In item 3. a. (2) change the total credits from '4' to '4 or 5'.

      (3) In item 3. a. (2), add the following courses:

            PHY 173 Studio Physics for Scientists and Engineers I  5
            PHY 193H Honors Physics I – Mechanics  4

      (4) In item 3. c. (2), change the credits of 'MTH 254H' from '3' to '4'.

   Effective Spring 2023.

5. Request to change the requirements for the Bachelor of Science degree in Computational Mathematics in the Department of Mathematics.

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

      (1) In item 3. a., change the total credits from '28 or 29' to '27 to 31'.

      (2) In item 3. a. (4) change the total credits from '8' to '8 to 10'.

      (3) In item 3. a. (4) (a), add the following courses:

            PHY 173 Studio Physics for Scientists and Engineers I  5
            PHY 193H Honors Physics I – Mechanics  4

      (4) In item 3. a. (4) (b), add the following courses:

            PHY 174 Studio Physics for Scientists and Engineers II  5
            PHY 294H Honors Physics II – Electromagnetism  4

      (5) In item 3. c. (2), change the credits of 'MTH 254H' from '3' to '4'.

   Effective Spring 2023.
6. Request to change the requirements for the Bachelor of Science degree in Mathematics in the Department of Mathematics. The Teacher Education Council (TEC) will consider this request.

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

(5) In item 3. a. change the total credits from '20 or 21' to '19 to 23'.

(6) Replace item 3. a. (3) with the following:

One of the following groups of courses (8 to 10 credits):
(a) PHY 183 Physics for Scientists and Engineers I  4
    PHY 184 Physics for Scientists and Engineers II  4
(b) PHY 193H Honors Physics I – Mechanics   4
    PHY 294H Honors Physics II – Electromagnetism  4
(c) LB  273 Physics I     4
    LB  274 Physics II     4
(d) PHY 173 Physics I     5
    PHY 174 Physics II     5

(7) In item 3. c. (1) change the total credits from '6 to 8' to '7 or 8'.

(8) In item 3. c. (1) (b) change the credits of MTH 153H from '3' to '4'.

(9) In item 3. c. (5) delete the following statement:

Students may use no more than one of Mathematics 309, 314, 317H to satisfy this requirement.

Add the following statement:

Students with credit in MTH 235 prior to entering the Mathematics major, only need 24 credits to fulfill this requirement.

(10) Replace items 3. c. (6) and (7) with the following:

(6) One of the following courses (3 credits):
    MTH 310 Abstract Algebra I and Number Theory  3
    MTH 418H Honors Algebra I

(7) One of the following courses (3 credits):
    MTH 320 Analysis I     3
    MTH 327H Honors Analysis I     3

(11) Add the following item 3. c. (9):

Two courses selected from two of the following groups (6 credits):

a. MTH 411 Abstract Algebra II  3
   MTH 414 Linear Algebra II     3
   MTH 416 Introduction to Algebraic Coding   3
   MTH 417 Topics in Number Theory    3
   MTH 419H Honors Algebra II     3
b. MTH 421 Analysis II     3
   MTH 425 Complex Analysis     3
   MTH 428H Honors Complex Analysis   3
   MTH 429H Honors Real Analysis    3
   MTH 442 Partial Differential Equations   3
c. MTH 441 Ordinary Differential Equations II   3
   MTH 451 Numerical Analysis I    3
   MTH 457 Introduction to Financial Math   3
   MTH 461 Metric and Topological Spaces   3
   MTH 481 Discrete Mathematics I    3

Students with credit in MTH 418H may not use MTH 411 to satisfy this requirement.

(12) Add the following item 3. d.:
One of the following courses (4 credits):
CMSE 202 Computational Modeling and Data Analysis II 4
CSE 231 Introduction to Programming I 4

Effective Spring 2023.

7. Request to change the requirements for the **Bachelor of Arts** degree in **Mathematics, Advanced** in the Department of Mathematics. The Teacher Education Council (TEC) will consider this request.

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

    (1) Change the total credits of 3. a. from ‘12 or 13’ to ‘13 or 14’.

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

        (a) Change the total credits from ‘4’ to ‘4 or 5’.

        (b) Add the following course:

        PHY 173 Studio Physics for Scientists and Engineers I 5

    Effective Spring 2023.

8. Request to change the requirements for the **Bachelor of Science** degree in **Mathematics, Advanced** in the Department of Mathematics. The Teacher Education Council (TEC) will consider this request.

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

    (3) Change the total credits of 3. a. from ‘17 to 21’ to ‘21 to 25’.

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

        (c) Change the total credits from ‘6 or 8’ to ‘8 or 10’.

        (d) Reletter item (c) to item (d).

        (e) Add the following item (c):

        PHY 173 Studio Physics for Scientists and Engineers I 5
        PHY 174 Studio Physics for Scientists and Engineers II 5

    Effective Spring 2023.
9. Request to change the requirements for the **Bachelor of Arts** degree in **Physics** in the Department of Physics and Astronomy. The Teacher Education Council (TEC) will consider this request.

   a. Under the heading **Requirements for the Bachelor of Arts Degree in Physics** replace item 3. a. with the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS 161</td>
<td>Cell and Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BS 162</td>
<td>Organismal and Population Biology</td>
<td>3</td>
</tr>
<tr>
<td>BS 181H</td>
<td>Honors Cell and Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BS 182H</td>
<td>Honors Organismal and Population Biology</td>
<td>3</td>
</tr>
<tr>
<td>ENT 205</td>
<td>Pests, Society and Environment</td>
<td>3</td>
</tr>
<tr>
<td>IBIO 150</td>
<td>Integrating Biology: From DNA to Populations</td>
<td>3</td>
</tr>
<tr>
<td>LB 144</td>
<td>Biology I: Organismal Biology</td>
<td>4</td>
</tr>
<tr>
<td>LB 145</td>
<td>Biology II: Cellular and Molecular Biology</td>
<td>5</td>
</tr>
<tr>
<td>MMG 141</td>
<td>Introductory Human Genetics</td>
<td>3</td>
</tr>
<tr>
<td>MMG 201</td>
<td>Fundamentals of Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>PLB 105</td>
<td>Plant Biology</td>
<td>3</td>
</tr>
<tr>
<td>PSL 250</td>
<td>Introductory Physiology</td>
<td>4</td>
</tr>
</tbody>
</table>

   b. Under the heading **Requirements for the Bachelor of Arts Degree in Physics** replace item 3. b. with the following:

   The following courses in the Department of Physics and Astronomy (33 to 38 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 183</td>
<td>Physics for Scientists and Engineers I</td>
<td>4</td>
</tr>
<tr>
<td>PHY 184</td>
<td>Physics for Scientists and Engineers II</td>
<td>4</td>
</tr>
<tr>
<td>PHY 191</td>
<td>Physics Laboratory for Scientists, I</td>
<td>1</td>
</tr>
<tr>
<td>PHY 192</td>
<td>Physics Laboratory for Scientists, II</td>
<td>1</td>
</tr>
<tr>
<td>PHY 193H</td>
<td>Honors Physics I - Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHY 294H</td>
<td>Honors Physics II - Electromagnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHY 191</td>
<td>Physics Laboratory for Scientists, I</td>
<td>1</td>
</tr>
<tr>
<td>PHY 192</td>
<td>Physics Laboratory for Scientists, II</td>
<td>1</td>
</tr>
</tbody>
</table>
(c) PHY 173 Studio Physics for Scientists and Engineers I 5
    PHY 174 Studio Physics for Scientists and Engineers II 5
(d) LB 273 Physics I 4
    LB 274 Physics II 4

(2) All of the following courses (12 credits):
    PHY 215 Thermodynamics and Modern Physics 3
    PHY 321 Classical Mechanics I 3
    PHY 410 Thermal and Statistical Physics 3
    PHY 471 Quantum Physics I 3

(3) One of the following courses (3 or 4 credits):
    PHY 431 Optics I 3
    PHY 440 Electronics 4

(4) One of the following groups of courses (4 or 6 credits):
    (a) PHY 490 Physics Senior Thesis 4
        Students must complete two enrollments of this course for a total of 4 credits.
    (b) Two of the following courses:
        PHY 491 Introduction to Condensed Matter Physics 3
        PHY 492 Introduction to Nuclear Physics 3
        PHY 493 Introduction to Elementary Particle Physics 3
        PHY 494 Survey of Physics Education Research (W) 3

Effective Spring 2023.

10. Request to change the requirements for the Bachelor of Science degree in Physics in the Department of Physics and Astronomy. The Teacher Education Council (TEC) will consider this request.

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

   (1) In item 3. a. change the total credits from ‘33 to 39’ to ‘35 to 40.

   (2) In item 3. b. (1) add the following new item (c) and reletter item (c) to item (d):

       PHY 173 Studio Physics for Scientists and Engineers I 5
       PHY 174 Studio Physics for Scientists and Engineers II 5

   (3) In item 3. b. (4) (b) add the following course:

       PHY 494 Survey of Physics Education Research (W) 3

Effective Spring 2023.
11. Request to establish a Graduate Certificate in Instrumentation in High Energy Physics in Department of Physics and Astronomy. The University Committee on Graduate Studies (UCGS) approved this request at its March 21, 2022 meeting.

a. **Background Information:**

In 2021, the Department of Energy (DOE) solicited proposals to meet the need for a highly trained workforce in High Energy Physics (HEP) instrumentation. This workforce is critical to carry out the development and operation of large-scale precision particle physics experiments. The presence of this workforce is important for U.S. scientific leadership and economic growth. MSU has a long history of instrumentation projects since the HEP group was established in 1968, with effort currently on upgrades to the ATLAS experiment and the successful operation of CMB-S4 and DUNE experiments. These projects are done with partners at national laboratories around the US, including SLAC Accelerator Laboratory in California, Fermi National Accelerator Laboratory in Illinois, Brookhaven National Laboratory in New York, and Argonne National Laboratory in Illinois. Most of the instrumentation used in HEP is also applicable and valuable for nuclear physics (NP). This is highly relevant as MSU is also the host of the Facility for Rare Isotope Beams (FRIB) facility, which is a nuclear physics laboratory and will host multiple experiments over the coming decades.

With funding from the DOE, MSU now has an opportunity to provide an exciting training opportunity in instrumentation leveraging these strengths. The Instrumentation in High Energy Physics certificate will make use of the partnerships, expertise, and projects underway at MSU and at FRIB. Students who are a part of this certificate program will join a dedicated cohort, have formal and informal mentoring, and the opportunity to work with experts at the national labs, including FRIB. Partnering academic programs at MSU include the Department of Chemistry in the College of Natural Science and can expand to include related engineering fields. The certificate will address all the major need areas highlighted in the recent DOE report: (1) advanced sensors for particle and radiation detection, including quantum devices; (2) application-specific front-end electronics and data acquisition; (3) systems design and engineering for complex instrumentation, including in extreme radiation, temperature, and low-background environments.

Students completing the certificate will be certified, well-trained, and ready for productive careers in HEP instrumentation where there are critical workforce needs nationally.

b. **Academic Programs Catalog Text:**

The Graduate Certificate in Instrumentation in High Energy Physics complements a graduate students’ degree in the field of instrumentation applicable to high energy physics. The TRAIN-MI program will bring together MSU’s strengths to formulate a curriculum addressing three major areas: (1) advanced sensors for particle and radiation detection, including quantum devices; (2) application-specific front-end electronics and data acquisition; and (3) systems design and engineering for complex instrumentation, including in extreme radiation, temperature, and low-background environments.

**Requirements for the Graduate Certificate in Instrumentation in High Energy Physics**

**CREDITS**

Students must complete all of the following courses (9 credits):

1. One of the following courses that includes instruction on particle interactions with matter. The topic must be approved by the Physics and Astronomy Graduate Program Director.
   - CEM 985 Selected Topics in Nuclear Chemistry 3
   - PHY 905 Special Problems 3

2. Two or more additional courses from the following list of approved courses, or any other 800 or 900-level accelerator science-focused courses as approved by the Physics and Astronomy Graduate Program Director.
   - CEM 985 Selected Topics in Nuclear Chemistry 3
   - HRT 860 Scientific Writing Workshop 3
   - PHY 905 Special Problems 3

Topics in CEM 985 and PHY 905 must be different than the topic used to fulfill requirement 1. above and must be approved by the Physics and Astronomy Graduate Program Director.
Students are expected to maintain a minimum cumulative grade-point average of 3.0 in all courses in the certificate.

Effective Spring 2023.

COLLEGE OF NURSING

1. Request to change the requirements for the Doctor of Philosophy degree in Nursing. The University Committee on Graduate Studies (UCGS) will consider this request at its September 19, 2022 meeting.

   a. Under the heading Requirements for the Doctor of Philosophy Degree in Nursing add the following statement:

   Part-time Students

   Although some students (post-BSN or post-master’s in nursing; post-DNP) choose to enroll in the Doctor of Philosophy degree program in Nursing on a part-time basis, all Ph.D. degree candidates will be expected to maintain minimum degree progress standards established by the College of Nursing and published in the College of Nursing Doctor of Philosophy Degree in Nursing Student Handbook. Students are also expected to complete at least one course per semester until the degree is earned.

Effective Spring 2023.

COLLEGE OF VETERINARY MEDICINE

1. Request to change the requirements for the Doctor of Veterinary Medicine degree in Veterinary Medicine in the College of Veterinary Medicine. The University Committee on Graduate Studies (UCGS) will consider this request at its September 19, 2022 meeting.

   a. Under the heading Admission to the Professional Program in Veterinary Medicine make the following changes:

      (1) Replace item 1. with the following:

      Academic performance: A minimum last-3-semester grade-point average (GPA) in combination with a minimum science prerequisite GPA of 3.0 is required for an application to receive review.

      (2) Delete the following paragraph:

      All prerequisite courses must be completed by the spring semester of the year of matriculation with a minimum grade of 2.0 in each course. One Hundred percent of the science prerequisite courses must be complete at the time of application, with a minimum grade of 2.0 in each course.

      Add the following paragraph:

      All science prerequisite courses must be completed at the time of application with a minimum grade of 2.0 in each course and a minimum science prerequisite GPA of 3.0. Up to 50% of the science prerequisite requirements may be satisfied with binary grading. General education requirements must be completed by July 1 prior to fall matriculation. Each course must receive a minimum grade of 2.0.

      (3) Under the heading General Education Requirements add the following statement:


Prerequisite individual General Education courses must receive a minimum grade of 2.0 (C) on a 4.0 scale. All general education requirements must be completed by July 1 of the matriculation year. If a bachelor's degree will be earned by July 1 of the matriculation year, all general education requirements are considered fulfilled and individual courses will not be reviewed. A Baccalaureate degree is not required.

Effective Spring 2023.
PART II - NEW COURSES AND CHANGES

COLLEGE OF ENGINEERING

AESC 210  Global Systems: Economics, Engineering, Environment
Fall of every year. Spring of every year. 3(3-0) P: (EGR 102 or CSE 231 or CSE 220) and (MTH 133 or LB 119 or MTH 153H) P: (EGR 102 or CSE 231 or CSE 220 or CMSE 202) and (MTH 133 or LB 119 or MTH 153H) R: Not open to freshmen.

Globalization as a process driven by economics, enabled by engineering, and constrained by the environment. Development of systems analysis tools for understanding how these themes interact globally. Enhancement of communication skills through teaming, presentations, and active listening.
SA: EGR 210
Effective Fall Semester 2018  Effective Spring Semester 2023

COLLEGE OF HUMAN MEDICINE

LCS 829  EPI 829  Design and Conduct of Epidemiological Studies and Clinical Trials
Principles and Methods of Epidemiologic Study Design
Spring of every year. 3(2-2) 3(3-0) Interdepartmental with Epidemiology P: (VM 533 or EPI 810) and (EPI 808 or EPI 808B) P: EPI 810 RB: EPI 810 R: Open to graduate students in the Department of Epidemiology and Biostatistics or in the Department of Large Animal Clinical Sciences or approval of department.

Effective Fall Semester 2014  Effective Summer Semester 2022

HM 618  Telemedicine Experiences in Rural Clinical Settings
On Demand. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P: HM 556 R: Open to graduate-professional students in the College of Human Medicine.

Clinical, biopsycosocial, documentation, and ethical aspects of telehealth to address health conditions and patient needs.
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 Spring Semester 2020  Effective Summer Semester 2022

COLLEGE OF NATURAL SCIENCE

IBIO 483  Environmental Physiology (W)
Spring of every year. 4(4-0) P: ((BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement) and (BS 162 or LB 144 or BS 182H) and (CEM 141 or CEM 151 or CEM 181H or LB 171)

REINSTATEMENT  Aspects of physiology important to the environmental relations of vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, and exercise physiology.
SA: ZOL 483
Effective Spring Semester 2023
NSC 820  Scanning Electron Microscopy; Energy Dispersive X-ray Microanalysis  
Fall of every year. Spring of every year. 3(2-2) RB: NSC 802 or concurrently  
Use of scanning electron microscope and energy dispersive x-ray microanalysis.  
Machine variables, artifacts, quantitative analysis, specimen preparation, darkroom  
procedures. Scanning electron microscopy and energy dispersive x-ray microanalysis  
theory and practice. Machine variables, artifacts, quantitative analysis, specimen  
preparation  
Effective Fall Semester 2000 Effective Fall Semester 2022

NEU 101  Frontiers in Neuroscience  
Fall of every year. Spring of every year. 1(1-0) R: Open to undergraduate students in the  
Neuroscience Major or in the Lyman Briggs Neuroscience Coordinate Major.  
NEW  
Introduction to the field of neuroscience and recent trends in neuroscience research,  
including an overview of careers with a degree in neuroscience. Campus and internet  
resources to achieve academic success and career goals.  
Request the use of the Pass-No Grade (P-N) system.  
Effective Fall Semester 2022

NEU 401  Cellular and Molecular Neuroscience  
Fall of every year. Spring of every year. 3(3-0) P: NEU 301 and NEU 302 R: Open to  
undergraduate students in the Neuroscience Major or in the Lyman Briggs Neuroscience  
Coordinate Major.  
NEW  
in-depth examination of cellular and molecular mechanisms that regulate function of  
neurons of the autonomic, sensory, motor, and central nervous systems.  
Effective Fall Semester 2021

AST 207  The Science of Astronomy  
Fall of every year. 3(3-0) P: (PHY 231 or concurrently) or (PHY 231C or concurrently) or (PHY  
183 or concurrently) or (PHY 183B or concurrently) or (ISP 205 or concurrently) or (LB 273 or  
concurrently) and ((MTH 114 or concurrently) or (MTH 116 or concurrently) or (MTH 132 or  
concurrently)) P: (PHY 231 or concurrently) or (PHY 231C or concurrently) or (PHY 183 or  
concurrently) or (PHY 183B or concurrently) or (PHY 173 or concurrently) or (LB 273 or  
concurrently) and ((MTH 114 or concurrently) or (MTH 116 or concurrently) or (MTH 132 or  
concurrently))  
In-depth study of one topic in astronomy with emphasis on key discoveries. Topics may  
be cosmology, the solar system, and the life of stars.  
Effective Fall Semester 2013 Effective Fall Semester 2022

AST 208  Planets and Telescopes  
Spring of every year. 3(2-2) P: (PHY 183 or PHY 183B or PHY 193H or LB 273) and ((MTH 103 or  
concurrently) or (MTH 114 or concurrently) or (MTH 116 or concurrently) or (MTH 132 or  
concurrently) or (LB 118 or concurrently)) RB: AST 207 R: Open to undergraduate students in the  
Astrophysics Major or in the LB-Astrophysics Coordinate Major.  
Origin and nature of the solar system. Planets of the solar system and other star  
systems. Determination of time and celestial coordinates. Astronomical instruments and  
observational methods.  
SA: AST 303, AST 312  
Effective Fall Semester 2013 Effective Spring Semester 2023

PHY 174  Studio Physics for Scientists and Engineers II  
Fall of every year. Spring of every year. 5(4-2) P: ((PHY 173 or LB 273) or (PHY 183 and PHY  
191) or (PHY 183B and PHY 191) or (PHY 193H and PHY 191)) and ((MTH 133 or concurrently)  
or (MTH 153H or concurrently) or (LB 119 or concurrently)) P: (PHY 173 or LB 273 or PHY 183 or  
PHY 183B or PHY 193H and (MTH 133 or concurrently) or (MTH 153H or concurrently) or (LB  
119 or concurrently)) Not open to students with credit in LB 274 or PHY 184 or PHY 184B or PHY  
192 or PHY 222 or PHY 232 or PHY 232c or PHY 234b or PHY 242 or PHY 294H.  
Basic principles of electricity and magnetism, development of scientific skills and  
problem-solving through integrated physics laboratory and discussion.  
Effective Fall Semester 2020 Effective Spring Semester 2023
PHY 321  Classical Mechanics I  
Fall of every year. Spring of every year. 3(3-0) P: ((PHY 215 or concurrently) or (PHY 215B or concurrently) or (MTH 235 or concurrently) or (MTH 340 or concurrently) or (MTH 347H or concurrently)) and CMSE 201 P: ((MTH 235 or concurrently) or (MTH 340 or concurrently) or (MTH 347H or concurrently)) and CMSE 201 and ((PHY 215 or concurrently) or (PHY 215B or concurrently))


Effective Spring Semester 2020 Effective Fall Semester 2022

PHY 494  Survey of Physics Education Research (W)  
On Demand. 3(3-0) P: (PHY 471 or concurrently) and completion of Tier I writing requirement R: Open to undergraduate students in the Department of Physics and Astronomy or in the Lyman Briggs Physics Coordinate Major or approval of department.

NEW

Historical background of physics education research including central findings and relevant learning theories. Topics include student learning and engagement, assessment, attitudes and beliefs, epistemology and framing, and issues of diversity and inclusivity.

Effective Fall Semester 2022

STT 200  Statistical Methods  
Fall of every year. Spring of every year. Summer of every year. 3(4-0) P: (MTH 101 or MTH 102 or MTH 103 or MTH 110 or MTH 116 or MTH 134 or MTH 132 or LB 118) or designated score on Mathematics Placement test P: (MTH 132 or MTH 102 or MTH 103 or MTH 116 or MTH 124 or MTH 132 or LB 118) or designated score on Mathematics Placement test R: Open to undergraduate students. Not open to students with credit in STT 201 or STT 421.

Data analysis, probability models, random variables, estimation, tests of hypotheses, confidence intervals, and simple linear regression.

Effective Spring Semester 2018 Effective Summer Semester 2020

STT 201  Statistical Methods  
Fall of every year. Spring of every year. Summer of every year. 4(3-2) P: (MTH 101 or MTH 102 or MTH 103 or MTH 110 or MTH 116 or MTH 124 or MTH 132 or LB 118) or designated score on Mathematics Placement test P: (MTH 132 or MTH 102 or MTH 103 or MTH 116 or MTH 124 or MTH 132 or LB 118) or designated score on Mathematics Placement test R: Open to undergraduate students. Not open to students with credit in STT 200 or STT 421.

Probability and statistics with computer applications. Data analysis, probability models, random variables, tests of hypotheses, confidence intervals, simple linear regression. Weekly lab using statistical software.

Effective Spring Semester 2018 Effective Summer Semester 2020

STT 464  Statistics for Biologists  
Fall of every year. 3(3-0) Interdepartmental with Animal Science and Crop and Soil Sciences. P: MTH 103 or MTH 110 or MTH 116 or MTH 132 P: MTH 132 or MTH 103 or MTH 116 or MTH 124 RB: STT 421

Biological random variables. Estimation of population parameters. Testing hypotheses. Linear correlation and regression. Analyses of counted and measured data to compare several biological groups including contingency tables and analysis of variance.

Effective Fall Semester 2016 Effective Summer Semester 2020

COLLEGE OF NURSING

NUR 220  Introduction to Nursing Scholarship  
Fall of every year. Spring of every year. 2(2-0) RB: Open to other majors with College approval. R: Open to students in the Prenursing major or in the Nursing major.

Prepares students to become consumers of research who critically evaluate and base their nursing care on evidence. Research methodologies essential to providing evidence-based nursing care.

Effective Spring Semester 2013 Effective Summer Semester 2022
NUR 221  Future of Nursing: Explore Potential Career Opportunities and Graduate Education  
Spring of every year. 2(2-0) RB: Open to other majors with College approval. R: Open to students in the Prenursing Major and open to students in the Nursing Major.  
NEW  Fosters student motivation in pursuing advanced degrees in nursing. The course will examine perspectives related to the future of nursing and provide the opportunity for students to explore post-BSN career opportunities and the options for graduate education in nursing.  
Effective Spring Semester 2023

NUR 921  Scientific Foundations of Nursing Knowledge Development  
Fall of every year. 3(3-0) R: Open to graduate students in the College of Nursing.  
Philosophical, epistemological, ontological, and ethical foundations of nursing. Historical factors and new perspectives in the evolution of nursing theory. The course will focus on a systematic search and literature synthesis plus identification of a clinical problem and gap in the science related to the students' area of interest. Students will analyze a concept of research interest and evaluate theoretical models and frameworks for exploring the clinical problem.  
Effective Fall Semester 2018  Effective Summer Semester 2022

NUR 939  Improving Health Outcomes: Scientific Foundations  
Spring of every year. 4(4-0) 3(3-0) P: NUR 921 or approval of college R: Open to doctoral students in the College of Nursing or in the Nursing Major.  
Application of the state of the science to wellness, risk reduction and chronic illness outcomes for populations across the lifespan from a nursing perspective.  
Effective Fall Semester 2018  Effective Spring Semester 2022

COLLEGE OF VETERINARY MEDICINE

LCS 643  Essentials for the Equine Practitioner  
Spring of every year. 6(6-0) P: LCS 616  
NEW  Advanced clerkship focusing on large animal medicine and surgery as well as equine theriogenology  
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 Semester 2021
VM 850  Independent Study
Fall of every year. Spring of every year. Summer of every year. 1 to 9 credits. A student may earn a maximum of 12 credits in all enrollments for this course. 
P: Approval of department.  R: Approval of department. A student may earn a maximum of 12 credits. N/A

NEW  Non-thesis research for Plan B master's students.
Request the use of the Pass-No Grade (P-N) system.
Effective Spring Semester 2023

VM 860  Grant Writing in the Biomedical Sciences
Fall of every year. 2(2-0) A student may earn a maximum of 2 credits in all enrollments for this course. RB: Minimum 1 year completed in a graduate program and active engagement in biomedical research R: Open to graduate students in the College of Veterinary Medicine or in the Comparative Medicine and Integrative Biology Major.

NEW  Practical approach to grant application development, preparation, and submission
Effective Spring Semester 2023