MICHIGAN STATE UNIVERSITY
University Committee on Curriculum

SUBCOMMITTEE A – AGENDA

Via Zoom
September 15, 2022
1:30 p.m.

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

NEU	425	Computational Modeling in Neuroscience	3
NEU	435	Ion Channels of Excitable Membranes	3
PLB	400	Introduction to Bioinformatics	3

Add the following courses:

NEU	417	Instrumental Methods of Analysis in Neuroscience	3
NEU	450	The Autonomic Nervous System	3
NEU	460	Current Approaches in Molecular and Cellular Neuroscience	3

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

IBIO	403	Integrative Neurobiology	3
NEU	425	Computational Modeling in Neuroscience	3
PSY	310	Psychology and Biology of Human Sexuality	3
PSY	402	Sensation and Perception (W)	3
PSY	493	Issues in Psychology (W)	3

Add the following courses:

IBIO	405	Neural Basis of Animal Behavior	3
NEU	310	Psychology and Biology of Human Sexuality	3
NEU	417	Instrumental Methods of Analysis in Neuroscience	3
NEU	440	Synaptic Transmission	3
NEU	450	The Autonomic Nervous System	3
NEU	460	Current Approaches in Molecular and Cellular Neuroscience	3
PHM	422	Fundamentals of Neuropharmacology	3
PSY	302	Sensation and Perception	3
PSY	333	The Neurobiology of Food Intake and Overeating	3

Remove PSY 493 from the note following.

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

NEU	425	Computational Modeling in Neuroscience	3
PSL	429	Biomedical Imaging Methods	3
PSY	402	Sensation and Perception (W)	3
PSY	493	Issues in Psychology (W)	3

Add the following courses:

NEU	417	Instrumental Methods of Analysis in Neuroscience	3
PSY	302	Sensation and Perception	3

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	3
(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:

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

BS	161	Cell and Molecular Biology	3
BS	162	Organismal and Population Biology	3
BS	181H	Honors Cell and Molecular Biology	3
BS	182H	Honors Organismal and Population Biology	3
ENT	205	Pests, Society and Environment	3
IBIO	150	Integrating Biology: From DNA to Populations	3
LB	144	Biology I: Organismal Biology	4
LB	145	Biology II: Cellular and Molecular Biology	5
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 groups of courses (5 to 6 credits):

(a)	CEM	141	General Chemistry	4
	CEM	161	Chemistry Laboratory I	1
(b)	CEM	151	General and Descriptive Chemistry	4
	CEM	161	Chemistry Laboratory I	1
(c)	CEM	181H	Honors Chemistry I	4
	CEM	185H	Honors Chemistry Laboratory I	2
(d)	LB	171	Principles of Chemistry I	4
	LB	171L	Introductory Chemistry Laboratory I	1

(3) One of the following groups of Mathematics courses (14 or 15 credits):

(a)	MTH	132	Calculus I	3
	MTH	133	Calculus II	4
	MTH	234	Multivariable Calculus	4
	MTH	235	Differential Equations	3
(b)	MTH	152H	Honors Calculus I	3
	MTH	153H	Honors Calculus II	4
	MTH	254H	Honors Multivariable Calculus	4
	MTH	235	Differential Equations	3
	or			
	MTH	340	Ordinary Differential Equations I	3
(c)	LB	118	Calculus I	4
	LB	119	Calculus II	4
	LB	220	Calculus III	4
	MTH	235	Differential Equations	3
	or			
	MTH	340	Ordinary Differential Equations I	3

(4) The following course (4 credits):

CMSE	201	Computational Modeling and Data Analysis I	4

(5) One additional mathematics courses at the 300-level or above of at least 3 credits. PHY 415 Methods of Theoretical Physics may be used towards the fulfillment of this requirement.

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):

(1) 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
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1
(b)	PHY	193H	Honors Physics I - Mechanics	4
	PHY	294H	Honors Physics II - Electromagnetism	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1

	(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

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

				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.
~~Applied analytical methods in experimental design. Assessment of health and disease status of animal and human populations. Risk assessment and interpretation of clinical trials.~~ Principles and methods of epidemiologic study design to maximize etiologic inference in human populations. Covers randomized trials, cohort studies, case-control studies, cross-sectional studies, ecological studies, and sources of bias.
~~Effective Fall Semester 2014~~ Effective Summer Semester 2022

~~HM 618~~
FM 619 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))
Newtonian point particles. Oscillations. One-particle chaos. Central-force motion. Systems of particles.
~~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 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 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. ~~R: 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