MICHIGAN STATE UNIVERSITY
University Committee on Curriculum

SUBCOMMITTEE A – AGENDA

Via Zoom
October 14, 2021
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) Delete item 3. a. (4).

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

PHY	221	Studio Physics for Life Scientists I	4
PHY	222	Studio Physics for Life Scientists II	4

      (3) Renumber items 3. g. (3), (4), and (5) to 3. g. (4), (5), and (6) respectively.

      (4) In item 3. i., delete the following courses:

IBIO	483	Environmental Physiology (W)	4
NSC	496	Directed Study in Human Biology	1 to 3
NSC	497	Internship in Human Biology	1 to 3
NSC	498	Research in Human Biology	1 to 3

   Effective Spring 2022.

2. Request to change the requirements for the **Bachelor of Science** degree in **Environmental Biology/Microbiology** in the Department of Microbiology and Molecular Genetics.

   a. Under the heading **Requirements for the Bachelor of Science Degree in Environmental Biology/Microbiology** replace item 3. with the following:

      a. The following courses outside the Department of Microbiology and Molecular Genetics (59 or 68 credits):

         (1) One of the following, either a. or b. (4 or 6 credits):

(a)	BMB	461	Advanced Biochemistry I	3
	BMB	462	Advanced Biochemistry II	3
(b)	BMB	401	Comprehensive Biochemistry	4

         (2) All of the following courses (18 credits):

CSS	210	Fundamentals of Soil Science	3
ENE	280	Principles of Environmental Engineering and Science	3
GLG	201	The Dynamic Earth	4
GLG	421	Environmental Geochemistry	4
IBIO	355	Ecology	3
IBIO	355L	Ecology Laboratory (W)	1

         (3) One of the following groups of courses (6 or 9 credits):

(a)	BS	161	Cell and Molecular Biology	3
	BS	162	Organismal and Population Biology	3
(b)	LB	144	Biology I: Organismal Biology	4
	LB	145	Biology II: Cell and Molecular Biology	5
(c)	BS	181H	Honors Cell and Molecular Biology	3
	BS	182H	Honors Organismal and Population Biology	3

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

		BS	171	Cell and Molecular Biology Laboratory	2
		BS	172	Organismal and Population Biology Laboratory	2
		BS	191H	Honors Cell and Molecular Biology Laboratory	2
		BS	192H	Honors Organismal and Population Biology Laboratory	2
		This requirement is waived for students who selected item (3) (b) above			
	(5)	One of the following groups of courses (9 or 10 credits):			
		(a) CEM	141	General Chemistry	4
		CEM	142	General and Inorganic Chemistry	3
		CEM	161	Chemistry Laboratory I	1
		CEM	162	Chemistry Laboratory II	1
		(b) LB	171	Principles of Chemistry I	4
		LB	172	Principles of Chemistry II	4
		LB	171L	Introductory Chemistry Laboratory I	1
		LB	172L	Principles of Chemistry II – Reactivity Laboratory	1
		(c) CEM	151	General and Descriptive Chemistry	4
		CEM	152	Principles of Chemistry	3
		CEM	161	Chemistry Laboratory I	1
		CEM	162	Chemistry Laboratory II	1
		(d) CEM	181H	Honors Chemistry I	4
		CEM	182H	Honors Chemistry II	4
		CEM	185H	Honors Chemistry Laboratory	2
	(6)	One of the following groups of courses (8 credits):			
		(a) CEM	251	Organic Chemistry I	3
		CEM	252	Organic Chemistry II	3
		CEM	255	Organic Chemistry Laboratory	2
		(b) CEM	351	Organic Chemistry I	3
		CEM	352	Organic Chemistry II	3
		CEM	355	Organic Chemistry Laboratory I	2
	(7)	One of the following (3 or 4 credits):			
		MTH	132	Calculus I	3
		LB	118	Calculus I	4
		MTH	152H	Honors Calculus I	3
	(8)	One of the following (3 credits):			
		STT	231	Statistics for Scientists	3
		STT	421	Statistics I	3
		MTH	133	Calculus II	3
	(9)	One of the following groups of courses (6 or 8 credits)			
		(a) PHY	231	Introductory Physics I	3
		PHY	232	Introductory Physics II	3
		(b) PHY	241	Physics for Cellular and Molecular Biologists I	4
		PHY	242	Physics for Cellular and Molecular Biologists II	4
		(c) PHY	183	Physics for Scientists and Engineers I	4
		PHY	184	Physics for Scientists and Engineers II	4
		(d) LB	273	Physics I	4
		LB	274	Physics II	4
		(e) PHY	193H	Honors Physics I-Mechanics	4
		PHY	294H	Honors Physics II-Electromagnetism	4
b.	The following courses in the Department of Microbiology and Molecular Genetics (19 credits):				
	(1)	All of the following courses (13 credits):			
		MMG	301	Introductory Microbiology	3
		MMG	302	Introductory Laboratory for General and Allied Health Microbiology	1
		MMG	421	Prokaryotic Cell Physiology	3
		MMG	425	Microbial Ecology	3

		MMG	431	Microbial Genetics	3
	(2)	One of the following courses (3 credits):			
		MMG	408	Advanced Microbiology Laboratory (W)	3
		MMG	494	Summer Undergraduate Research Institute in Genomics (W)	3
	(3)	One of the following two options (3 credits):			
		(a) MMG	491	Current Topics in Microbiology and Molecular Genetics	3
		(b) MMG	492	Undergraduate Research Seminar	1
		One of the following courses:			
		MMG	499	Undergraduate Research	2
		MMG	499H	Honors Research	2
		(c) MMG	493	Professional Internship in Microbiology and Molecular Genetics	3
		The completion of either of these three options fulfills the department's capstone course requirement.			
c.	One course from two of the following areas (6 to 8 credits):				
	(1)	CSS	455	Pollutants in the Soil Environment	3
	(2)	FOR	340	Forest Ecology	3
		PLB	402	Biology of Fungi	4
	(3)	FSC	440	Food Microbiology	3
	(4)	GEO	206	Physical Geography	3
		GEO	221	Introduction to Geographic Information	3
	(5)	GLG	435	Geomicrobiology	4
	(6)	MMG	445	Microbial Biotechnology (W)	3
	(7)	FOR	466	Natural Resource Policy	3
		IBIO	446	Environmental Issues and Public Policy	3
	(8)	FW	420	Stream Ecology	3
		FW	472	Limnology	3
	(9)	MMG	433	Microbial Genomics	3
		PLB	400	Introduction to Bioinformatics	3
	(10)	IBIO	357	Global Change Biology (W)	3

Effective Spring 2022.

3. Request to change the requirements in the **Bachelor of Science** degree in **Genomics and Molecular Genetics** in the Department of Microbiology and Molecular Genetics.

a. Under the heading **Requirements for the Bachelor of Science Degree in Microbiology and Molecular Genetics** make the following changes:

(1) In item 3. a. (4) (d) delete the following course:

CEM	186H	Honors Chemistry Laboratory II	2

(2) In item 3. a. (6) delete the following course:

ZOL	341	Fundamental Genetics	4

Add the following course:

IBIO	341	Fundamental Genetics	4

(3) Replace item 3. a. (7) with the following:

	One of the following groups of courses (6 to 8 credits)				
	(a)	PHY	231	Introductory Physics I	3
		PHY	232	Introductory Physics II	3
	(b)	LB	273	Physics I	4
		LB	274	Physics II	4
	(c)	PHY	183	Physics for Scientists and Engineers I	4

	PHY	184	Physics for Scientists and Engineers II	4
(d)	PHY	193H	Honors Physics I – Mechanics	4
	PHY	294H	Honors Physics II – Electromagnetism	4
(e)	PHY	241	Physics for Cellular and Molecular Biologists I	4
	PHY	242	Physics for Cellular and Molecular Biologists II	4

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

(a) Change the total credits from ‘19’ to ’19 to 20’.

(b) In item (2) change the total credits from ‘3’ to ‘3 or 4’.

(c) In item (2) change the credits of ‘MMG 334’ from ‘3’ to ‘4’.

(d) In item (2) add the following course:

MMG	494	Summer Undergraduate Research Institute in Genomics (W)	3

(5) Change item 3. b. (3) to the following:

One of the following three options (3 credits):

(a)	MMG	491	Current Topics in Microbiology and Molecular Genetics	3
(b)	MMG	492	Undergraduate Research Seminar	1
	One of the following courses:			
	MMG	499	Undergraduate Research	2
	MMG	499H	Honors Research	2
(c)	MMG	493	Professional Internship in Microbiology and Microbiology and Molecular Genetics	3

The completion of Microbiology 491, 493; or Microbiology 492 and 499 or 499H, fulfills the department’s capstone course requirement.

(6) In item 3. c. delete the following courses:

CSS	441	Plant Breeding and Biotechnology	3
PLB	400	Introduction to Bioinformatics	3
ZOL	445	Evolution (W)	3

Add the following courses:

ANS	404	Introduction to Quantitative Genetics	3
CMSE	201	Computational Modeling and Data Analysis I	4
CMSE	202	Computational Modeling and Data Analysis II	4
CMSE	410	Bioinformatics and Computational Biology	3
CMSE	411	Computational Medicine	3
CSS	451	Biotechnology Applications for Plant Breeding and Genetics	3
IBIO	445	Evolution (W)	3

Effective Spring 2022.

4. Request to change the requirements in the **Bachelor of Science** degree in **Microbiology** in the Department of Microbiology and Molecular Genetics.

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

(1) In item 3. a. (4) (d) delete the following course:

CEM	186H	Honors Chemistry Laboratory II	2

(2) In item 3. a. (6) change the total credits from '8 to 10' to '6 to 8'.

(3) In item 3. a. (6) (a) delete the following courses:

PHY	251	Introductory Physics Laboratory I	1
PHY	252	Introductory Physics Laboratory II	1

(4) In item 3. a. (6) (c) delete the following courses:

PHY	191	Physics Laboratory for Scientists, I	1
PHY	192	Physics Laboratory for Scientists, II	1

(5) In item 3. a. (6) (d) delete the following courses:

PHY	191	Physics Laboratory for Scientists, I	1
PHY	192	Physics Laboratory for Scientists, II	1

(6) Add item 3. a. (6) (e):

PHY	241	Physics for Cellular and Molecular Biologists I	4
PHY	242	Physics for Cellular and Molecular Biologists II	4

(7) In item 3. b. (1) change the total credits from '13' to '10' and delete the following course:

MMG	408	Advanced Microbiology Laboratory (W)	3

(8) Renumber item 3. b. (2) to item 3. b. (3).

(9) Add a new item 3. b. (2):

One of the following courses (3 credits):

MMG	408	Advanced Microbiology Laboratory (W)	3
MMG	494	Summer Undergraduate Research Institute in Genomics (W)	3

(10) Change item 3. b. (3) to the following:

One of the following, either (a), (b), or (c) (3 credits):

(a)	MMG	491	Current Topics in Microbiology and Molecular Genetics	3
(b)	MMG	492	Undergraduate Research Seminar	1
	and			
	One of the following courses:			
	MMG	499	Undergraduate Research	2
	MMG	499H	Honors Research	2
(c)	MMG	493	Professional Internship in Microbiology and Molecular Genetics	3

The completion of Microbiology 491, 493, or Microbiology 492 and 499 or 499H, fulfills the department's capstone course requirement.

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

MMG	463	Medical Microbiology	3

Add the following courses:

MMG	365	Medical Microbiology	3
MMG	465	Advanced Medical Microbiology	3

Effective Spring 2022.

5. Request to change the requirements in the **Doctor of Philosophy** degree in **Microbiology and Molecular Genetics** in the Department of Microbiology and Molecular Genetics. The University Committee on Graduate Studies (UCGS) will consider this request at its October 18, 2021 meeting.

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

Admission to the Doctor of Philosophy degree in Microbiology and Molecular Genetics is through the BioMolecular Science Gateway – First Year (BMS). The successful applicant will typically have: a bachelor's degree (four-year or equivalent) or Master of Science degree that includes course work that demonstrates proficiency in math and science; a grade point average of 3.50 or above; significant research experience equivalent to a minimum of one full-time summer research experience or four semesters of part-time research experience; and strong letters of reference.

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

The student must:

1. Complete a minimum of four graduate courses (excluding topics and seminar courses) covering the areas of genetics, microbiology, and biochemistry. At least two of these courses must be offered by the Department of Microbiology and Molecular Genetics.
   a. One course must focus on Molecular Biology or Genetics and include one of the following courses or an approved equivalent as approved by the Director of Graduate Studies.

BMB	801	Molecular Biology	3
MMG	833	Microbial Genetics	3
MMG	835	Eukaryotic Molecular Genetics	3

   b. One course must focus on Cell Biology or Cell Physiology and include one of the following courses or an approved equivalent as approved by the Director of Graduate Studies.

BMB	802	Metabolic Regulation and Signal Transduction	3
MMG	801	Integrative Microbial Biology	4
MMG	825	Cell Structure and Function	3

   c. Other approved course electives include:

BMB	803	Protein Structure and Function	2
BMB	805	Protein Structure, Design, and Mechanism	3
MMG	813	Molecular Virology	3
MMG	851	Immunology	3
MMG	861	Advanced Microbial Pathogenesis	3

2. Complete three special topics graduate seminar courses (MMG 803, MMG 991 or other departmental seminar courses as approved by the Director of Graduate Studies chosen to increase the breadth and depth of knowledge in your field.
3. Pass a comprehensive examination that includes a written research proposal, public seminar and oral examination with the student's guidance committee.
4. Complete 24 credits of MMG 999 Doctoral Dissertation Research.
5. Submit a dissertation and a publishable manuscript based on original research and representing a new and significant contribution to knowledge.

All doctoral students in microbiology and molecular genetics are required to participate in laboratory teaching through enrollment of 1 credit of MMG 892 and are expected to attend departmental seminars through enrollment in 4 credits of MMG 892. In addition, all students must participate in the Work in Progress (WiPs) seminar series.

Effective Spring 2022.

6. Request to change the requirements for the **Doctor of Philosophy** degree in **Plant Biology** in the Department of Plant Biology. The University Committee on Graduate Studies (UCGS) will consider this request at its October 18, 2021 meeting.

   a. Under the heading **Requirements for the Doctor of Philosophy Degree in Plant Biology** make the following changes:

      (1) In item 1. a. delete the following course:

PLB	804	Frontiers in Plant Biology	2

      (2) Replace item 1. c. delete the following courses:

ZOL	891	Current Topics in Ecology and Evolution	1
ZOL	895	Seminar	1

      Add the following courses:

IBIO	891	Current Topics in Ecology and Evolution	1
IBIO	895	Seminar	1

Effective Spring 2022.

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 October 18, 2021 meeting.

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

      (1) In item 1. change the total credits from ’66’ to ’65’.

      (2) Under the **Course Requirements** in item 3., change the credits from ‘3’ to ‘1 to 3’.

Effective Spring 2022.

COLLEGE OF OSTEOPATHIC MEDICINE

1. Request to 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) will consider this request at its October 18, 2021 meeting.

   a. Under the heading **Requirements for the Doctor of Osteopathic Medicine Degree** make the following changes:

      (1) Under the heading **PreClerkship Curriculum** make the following changes:

         (a) Change the total credits from ‘98’ to ‘99’ and add the following course:

OST	558	Pediatrics IV	1

         (b) Delete the following course:

OST	580	Respiratory System	6

         Add the following course:

OST	580	Respiratory System	7

(2) Under the heading **Clerkship Curriculum** make the following changes:

(a) Under the heading *Required Clinical Clerkship **Core** Rotation Courses* change 'OST 653' to 'OSS 653'.

(b) Under the heading *Required clinical elective clerkship rotation courses* add the following courses:

OST	622	Addiction Medicine	3
OST	623	Board Preparation	1 to 6
OST	624	Essentials in Diabetes	3

Effective Spring 2022.

COLLEGE OF VETERINARY MEDICINE

1. Request to change the requirements for the **Bachelor of Science** degree in **Veterinary Nursing** in the College of Veterinary Medicine.

a. Under the heading **Admission**, in paragraph four, change item 1. to the following:

Completion of at least 28 credits of the University graduation requirements or transfer equivalents including:

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

(1) In item 1., change paragraph three to the following:

The University's Tier II writing requirement for the Veterinary Nursing major is met by completing the following courses: Veterinary Medicine 410 and 412. Those courses are referenced in items 2. a. below.

(2) In item 2., change the total credits from '102 credits' to '90 to 97 credits'.

(3) In item 2. a. change the total credits from '72 credits' to '75 credits'.

(4) In item 2. a., add the following to the existent list of courses:

and
One of the following courses (3 credits)

VM	414	Veterinary Nursing Clerkship in Equine Medicine and Surgery	3
VM	415	Veterinary Nursing Clerkship in Food Animal and Equine Medicine and Surgery	3
VM	450	Veterinary Nursing Clerkship in Emergency Medicine	3
VM	451	Veterinary Nursing Clerkship in Cardiology	3
VM	452	Veterinary Nursing Clerkship in Neurology	3
VM	453	Veterinary Nursing Clerkship in Ophthalmology	3
VM	454	Veterinary Nursing Clerkship in Critical Care	3
VM	458	Veterinary Nursing Clerkship in Companion Animal Diagnostic Ultrasound	3
VM	466	Veterinary Nursing Clerkship in Large Animal Anesthesia	3
VM	470	Veterinary Nursing Clerkship in Food Animal Medicine	3
VM	480	Veterinary Nursing Clerkship in Clinical Pathology	3
VM	482	Veterinary Nursing Clerkship in Necropsy	3
VM	483	Veterinary Nursing Clerkship in Biomedical Research	3
VM	484	Veterinary Nursing Clerkship in Zoo and Wildlife Medicine	3
VM	486	Veterinary Nursing Clerkship in Clinical Parasitology	3
VM	490	Veterinary Nursing Clerkship in Special Problems	3

(5) In item 2. b., renumber item (3) to item (4).

(6) Add the following item (3) in item 2. b.:

(3)	MTH	103A	College Algebra I	3
	MTH	103B	College Algebra II	3
	and			
	One of the following:			
	MTH	101	Quantitative Literacy I	3
	MTH	102	Quantitative Literacy II	3
	MTH	114	Trigonometry	3
	MTH	201	Elementary Mathematics for Teachers I	3
	STT	200	Statistical Methods	3
	STT	201	Statistical Methods	4

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

One of the following options, 15 credits from Elective Group 1 or 15 credits from Elective Group 2. Courses used to satisfy requirement 2. a. above may not be used to fulfill this requirement.

(1) **Veterinary Nursing Elective Group 1**:

VM	414	Veterinary Nursing Clerkship in Equine Medicine and Surgery	3 to 6
VM	415	Veterinary Nursing Clerkship in Food Animal and Equine Medicine and Surgery	3 to 6
VM	450	Veterinary Nursing Clerkship in Emergency Medicine	3
VM	451	Veterinary Nursing Clerkship in Cardiology	3
VM	452	Veterinary Nursing Clerkship in Neurology	3
VM	453	Veterinary Nursing Clerkship in Ophthalmology	3
VM	454	Veterinary Nursing Clerkship in Critical Care	3
VM	458	Veterinary Nursing Clerkship in Companion Animal Diagnostic Ultrasound	3
VM	466	Veterinary Nursing Clerkship in Large Animal Anesthesia	3
VM	470	Veterinary Nursing Clerkship in Food Animal Medicine	3 to 6
VM	480	Veterinary Nursing Clerkship in Clinical Pathology	3
VM	482	Veterinary Nursing Clerkship in Necropsy	3
VM	483	Veterinary Nursing Clerkship in Biomedical Research	3 to 12
VM	484	Veterinary Nursing Clerkship in Zoo and Wildlife Medicine	3 to 12
VM	486	Veterinary Nursing Clerkship in Clinical Parasitology	3
VM	490	Veterinary Nursing Clerkship in Special Problems	3 to 12

(2) **Veterinary Nursing Elective Group 2**. Complete 15 credits in courses from one of the following concentrations. All course selections must be approved by the Veterinary Nursing Program.

Business Communication

ACC	230	Survey of Accounting Concepts	3
AFRE	100	Decision-making in the Agri-Food System	3
AFRE	130	Farm Management I	3
AFRE	203	Data Analysis for the Agri-Food system	3
AFRE	222	Agribusiness and Food Industry Sales	3
AFRE	232	Commodity Marketing I	3
AFRE	240	Food Product Marketing	3
AFRE	315	Labor and Personnel Management in Agri-Food System	3
AFRE	327	Global Agri-Food Industries and Markets	3
AFRE	435	Financial Management in the Agri-Food System	3
COM	100	Human Communication	3
COM	225	An Introduction to Interpersonal Communication	3
COM	240	Introduction to Organizational Communication	4
EC	201	Introduction to Microeconomics	3
EC	202	Introduction to Macroeconomics	3
EAD	315	Student Leadership Training	3
FI	320	Introduction to Finance	3

HRLR	211	Introduction to Organizational Leadership	3
HRLR	311	Applied Organizational Leadership	3
General Animal Science			
ANS	110	Introductory Animal Agriculture	3
ANS	110L	Introductory Animal Agriculture Laboratory	1
ANS	134	Dairy Production I	3
ANS	200C	Dairy Cattle Genetics and Evaluation	2
ANS	200E	Introductory Animal Welfare Assessment	1
ANS	201	Animal Products	3
ANS	201L	Animal Products Laboratory	1
ANS	210	Introduction to Disciplines in Animal Agriculture	3
ANS	211	Animal and Product Evaluation	3
ANS	222	Introductory Beef Cattle Management	3
ANS	234	Dairy Production II	3
ANS	252	Introduction to Management of Avian Species	3
ANS	262	Introductory Sheep Management	3
ANS	272	Introductory Swine Management	3
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 (W)	4
ANS	334	Dairy Management I	3
ANS	401	Ethical Issues in Animal Agriculture	1
ANS	407	Food and Animal Toxicology	3
ANS	413	Non-Ruminant Nutrition	4
ANS	418	Animal Agriculture and the Environment	3
ANS	422	Advanced Beef Cattle Feedlot Management	3
ANS	425	Animal Biotechnology	3
ANS	427	Environmental Toxicology and Society	3
ANS	442	Advanced Horse Management	3
ANS	445	Equine Exercise Physiology	4
ANS	455	Avian Physiology	4
ANS	472	Advanced Swine Management	3
ANS	480	Animal Systems in International Development	3
ANS	483	Ruminant Nutrition	3
General Zoo and Wildlife			
EPI	390	Disease in Society: Introduction to Epidemiology and Public Health	4
FW	101	Fundamentals of Fisheries and Wildlife Ecology and Management	3
FW	110	Conservation and Management of Marine Resources	3
FW	181	Introduction to Science, Technology, the Environment and Public Policy	3
FW	364	Ecological Problem Solving	3
FW	413	Wildlife Research and Management Techniques	3
FW	423	Principles of Fish and Wildlife Disease	3
FW	423L	Principles of Fish and Wildlife Disease Laboratory	1
FW	424	Population Analysis and Management	4
FW	444	Conservation Biology	3
FW	449	Wildlife Policy	3
FW	491	Special Topics in Fisheries and Wildlife	1 to 3
IBIO	313	Animal Behavior	3
IBIO	341	Fundamental Genetics	4
IBIO	355	Ecology	3
IBIO	355L	Ecology Laboratory (W)	1
IBIO	369	Introduction to Zoo and Aquarium Science	3
IBIO	408	Histology	4
IBIO	413	Laboratory in Behavioral Neuroscience (W)	4
IBIO	415	Ecological Aspects of Animal Behavior (W)	3
NEU	300	Neurobiology	3
Sustainability and Policy			
AFRE	100	Decision-making in the Agri-Food System	3

AFRE	206	World Food, Population and Poverty	3
ANR	250	Global Issues in Agriculture and Natural Resources	3
ANS	124	Introduction to Sustainable Agriculture and Food Systems	2
ANS	418	Animal Agriculture and the Environment	3
ANS	424	Sustainable Agriculture and Food Systems: Integration and Synthesis	3
ANS	480	Animal Systems in International Development	3
CSS	101	Introduction to Crop Science	3
CSS	120	Issues in Food and Agriculture	3
CSS	124	Introduction to Sustainable Agriculture and Food Systems	1
CSS	222	New Horizons in Biotechnology	2
EC	201	Introduction to Microeconomics	3
EC	202	Introduction to Macroeconomics	3
EPI	390	Disease in Society: Introduction to Epidemiology and Public Health	4
FW	434	Human Dimensions of Fisheries and Wildlife Management (W)	3
FW	445	Biodiversity Conservation Policy and Practice	3
IBIO	446	Environmental Issues and Public Policy	3
HRT	251	Organic Farming Principles and Practices	3
PHL	380	Nature of Science	3
SOC	161	International Development and Change	3
SOC	252	Introduction to Environmental Sociology	3
Pharmacology and Toxicology			
ANS	407	Food and Animal Toxicology	3
ANS	427	Environmental Toxicology and Society	3
BMB	200	Introduction to Biochemistry	4
EPI	390	Disease in Society: Introduction to Epidemiology and Public Health	4
NEU	300	Neurobiology	3
PHL	380	Nature of Science	3
PHM	350	Introductory Human Pharmacology	3
PHM	351	Fundamentals of Drug Safety	3
PHM	431	Pharmacology of Drug Addiction	3
PHM	450	Introduction to Chemical Toxicology	3
Ecology and Resource Management			
AFRE	265	Ecology and Economics	3
ANS	124	Introduction to Sustainable Agriculture and Food Systems	2
ANS	418	Animal Agriculture and the Environment	3
FOR	419	Applications of Geographic Information Systems to Natural Resources Management	4
FW	181	Introduction to Science, Technology, the Environment and Public Policy	3
FW	364	Ecological Problem Solving	3
FW	413	Wildlife Research and Management Techniques	3
FW	417	Wetland Ecology and Management	3
FW	423	Principles of Fish and Wildlife Disease	3
FW	423L	Principles of Fish and Wildlife Disease Laboratory	1
FW	424	Population Analysis and Management	4
FW	434	Human Dimensions of Fisheries and Wildlife Management (W)	3
FW	463	Wildlife Disease Ecology	3
IBIO	355	Ecology	3
IBIO	355L	Ecology Laboratory (W)	1
Animal Management			
AFRE	130	Farm Management I	3
ANS	110	Introductory Animal Agriculture	3
ANS	110L	Introductory Animal Agriculture Laboratory	1
ANS	134	Dairy Production I	3
ANS	222	Introductory Beef Cattle Management	3
ANS	233	Dairy Feed Management	3
ANS	234	Dairy Production II	3

ANS	252	Introduction to Management of Avian Species	3
ANS	262	Introductory Sheep Management	3
ANS	272	Introductory Swine Management	3
ANS	309	Animal Health and Disease Management	3
ANS	334	Dairy Management I	2
ANS	401	Ethical Issues in Animal Agriculture	1
ANS	422	Advanced Beef Cattle Feedlot Management	3
ANS	442	Advanced Horse Management	3
ANS	472	Advanced Swine Management	3
Animal Products and Nutrition			
ANS	110	Introductory Animal Agriculture	3
ANS	201	Animal Products	3
ANS	201L	Animal Products Laboratory	1
ANS	211	Animal and Product Evaluation	3
ANS	233	Dairy Feed Management	3
ANS	313	Principles of Animal Feeding and Nutrition (W)	4
ANS	407	Food and Animal Toxicology	3
ANS	413	Non-Ruminant Nutrition	4
ANS	483	Ruminant Nutrition	3

Effective Spring 2022.

PART II - NEW COURSES AND CHANGES

COLLEGE OF NATURAL SCIENCE

BMB 370 Introductory Biochemistry Laboratory
Fall of every year. Spring of every year. 3(2-3) P: {(MTH 116 or LB 117) or (MTH 103 and MTH 114)} and (BS 171 or BS 191H or LB 145) and (CEM 162 or CEM 185H or LB 172L) R: Open to undergraduate students in the Biochemistry and Molecular Biology/Biotechnology Major or in the Biochemistry and Molecular Biology major or in the Lyman Briggs Biochemistry and Molecular Biology Coordinate Major or in the Lyman Briggs-Biochemistry/Biotechnology Coordinate Major or approval of department.

NEW Basic quantitative laboratory introducing biochemical methods and principles for the study of proteins and nucleic acids and data analysis.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Summer 2022

BMB 470 Advanced Molecular Biology Laboratory
Fall of every year. 4(2-4) ~~P: CEM 262 and BMB 461~~ P: BMB 370 and BMB 461 RB: BMB 462 R: Open to students in the Biochemistry and Molecular Biology/Biotechnology Major or in the Biochemistry and Molecular Biology major or in the Lyman Briggs Biochemistry and Molecular Biology Coordinate Major or in the Lyman Briggs-Biochemistry/Biotechnology Coordinate Major or approval of department.

Methods of molecular biology and the underlying principles on which these methods are based.
SA: BCH 472, BMB 472
~~Effective Fall 2021~~ Effective Fall 2023

BMB 471 Advanced Biochemistry Laboratory
Spring of every year. 4(2-4) ~~P: BMB 461 and CEM 262 and CMSE 201~~ P: BMB 370 and BMB 461 and CMSE 201 R: Open to students in the Biochemistry and Molecular Biology/Biotechnology Major or in the Biochemistry and Molecular Biology major or in the Lyman Briggs Biochemistry and Molecular Biology Coordinate Major or in the Lyman Briggs-Biochemistry/Biotechnology Coordinate Major or approval of department.

Biochemical methods and principles used in the study of enzymes (proteins), carbohydrates, lipids, and cell organelles.
SA: BCH 471
~~Effective Spring 2022~~ Effective Fall 2023

BMB 829 ~~Methods of Macromolecular Analysis and Synthesis~~
Special Problems in Macromolecular Analysis and Synthesis
Fall of every year. ~~2(2-0)~~ 1 credit. A student may earn a maximum of 5 credits in all enrollments for this course. ~~RB: BMB 462 or concurrently~~ RB: (BMB 461 and BMB 462) or or equivalent background is recommended

~~Techniques of isolation and characterization of macromolecules. Computer use in structure-function analysis of macromolecules.~~ Techniques of isolation and characterization of macromolecules. Topics May Vary.
SA: BCH 829
~~Effective Fall 2001~~ Effective Fall 2022

MTHE 999 Doctoral Dissertation Research
Fall of every year. Spring of every year. Summer of every year. 1 to 24 credits. ~~A student may earn a maximum of 30 credits in all enrollments for this course.~~ A student may earn a maximum of 36 credits in all enrollments for this course. RB: MTHE 926 and MTHE 927 and MTHE 954

Doctoral dissertation research.
Request the use of the Pass-No Grade (P-N) system.
SA: SME 999
~~Effective Summer 2014~~ Effective Fall 2021

MMG 433 ~~Microbial Genomics~~
Genomics (W)
Spring of every year. 3(3-0) ~~P: (MMG 431)~~ P: MMG 431 RB: (MMG 421 or BMB 461) and CSE 101
~~Structure of microbial genomes and implications for growth and evolution of bacteria and fungi. Computer analysis of genome sequence databases. Applications to gene expression and phylogenetic analysis.~~ High-throughput DNA sequencing and the study of genome structure, replication, evolution. Application of bioinformatics analyses for functional annotation, genetic diversity, ecology, and human health.
~~Effective Fall 2015~~ Effective Summer 2021

MMG 493 Professional Internship in Microbiology & Molecular Genetics
Fall of every year. Spring of every year. Summer of every year. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. P: Completion of Tier I Writing Requirement RB: Students must apply for and be hired in a department-approved internship before enrolling in this course R: Open to sophomores or juniors or seniors in the Department of Microbiology and Molecular Genetics. Approval of department.

NEW Off-campus capstone option involving professional work experience in a private or public sector organization related to the student's major in the Department of Microbiology & Molecular Genetics. Students must apply and be hired by an organization before enrolling in this course.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Summer 2021

MMG 494L Summer Undergraduate Research Institute in Genomics (W) (W)
Summer of every year. 3(2-12) P: (Completion of Tier I Writing Requirement) and (MMG 301 and MMG 302) RB: MMG 431 or IBIO 341 R: Open to undergraduate students in the Environmental Biology/Microbiology Major or in the Genomics and Molecular Genetics Major or in the Microbiology Major. Not open to students with credit in MMG 408 or MMG 434.

NEW This course aims give students an authentic research experience. It would be a directed, yet independent research undertaken by the students in teams, using state-of-the- art genetic and genomic methods. Projects will include hypothesis generation, experimental design, use of advanced molecular biology techniques, data analysis and its interpretation. Students will also learn to read, understand and present scientific research papers during the Journal Club meetings. Students will communicate their research findings in written lab reports, oral presentation, or Mid-SURE. Offered first half of semester.
Effective Summer 2021

AST 410 Senior Thesis
Fall of every year. Spring of every year. ~~Summer of every year.~~ 1 to 4 credits. A student may earn a maximum of 5 credits in all enrollments for this course. ~~P: (AST 301) and completion of Tier I writing requirement.~~ P: (AST 304 or AST 308) and completion of Tier I writing requirement
~~Design and execute an original experiment or computation. A written and oral report of the research is required.~~ The capstone course for undergraduate astrophysics majors, focusing on effective written and oral communication in the context of an in-depth investigation of an astronomical topic.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
~~Effective Fall 2013~~ Effective Fall 2021

PLB 105 Plant Biology
Fall of every year. Spring of every year. Summer of every year. 3(3-0)
~~Plant structure, function, development, genetics, diversity and ecology.~~ Plant structure, function, development, genetics, diversity and ecology. Offered first half of semester.
SA: BOT 105
~~Effective Fall 2014~~ Effective Summer 2021

COLLEGE OF OSTEOPATHIC MEDICINE

OST 625 Introduction to Military Medicine Elective
On Demand. 6 to 9 credits. A student may earn a maximum of 9 credits in all enrollments for this course. RB: Medical students on HPSP scholarship R: Open to graduate students in the College of Osteopathic Medicine.

NEW OST 625 will provide osteopathic medical students with an introduction to military medicine.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Summer 2022

OST 626 Special Topics in Healthcare Ethics: Case Studies
Fall of every year. Spring of every year. Summer of every year. 3(3-0) R: Open to graduate students in the College of Osteopathic Medicine. Approval of college.

NEW Focus is on increasing the knowledge of healthcare ethics and application to case studies. This two week clerkship rotation will explore the evaluation and critical appraisal of ethical issues in patient cases.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Spring 2022

OST 627 Fundamentals of Health Policy and Advocacy
Fall of every year. Spring of every year. Summer of every year. 3(3-0) R: Open to graduate students in the College of Osteopathic Medicine. Approval of college.

NEW Focus is on increasing the knowledge of healthcare policy and advocacy. This two week rotation will explore legislative, media and organizational opportunities for physician advocacy.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Spring 2022