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

- 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	f the follow	wing, eith	er 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 t	All of the following courses (18 credits):					
	CSS	210	Funda	mentals of Soil Science	3		
	ENE	280	Princip	les of Environmental Engineering			
				and Science	3		
	GLG	201		/namic Earth	4		
	GLG	421	Enviro	nmental Geochemistry	4		
	IBIO	355	Ecolog	У	3		
	IBIO	355L		y 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	f the follow	wing cour	ses (2 credits):			

b.

	BS	171		d Molecular Biology Laboratory	2
					2
	BS	172	Organis	mal and Population Biology	
				Laboratory	2
	BS	191H	Honors	Cell and Molecular Biology	
				Laboratory	2
	BS	192H	Honors	Organismal and Population	
	20			Biology Laboratory	2
	Thio ro	auiromon	t io woivo	d for students who selected item	2
				a for students who selected item	
<i>(</i> _)	(3) (b) a				
(5)	One of	the follow		os 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
	(D)				
		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		1
	(-1)			Chemistry Laboratory II	
	(d)	CEM	181H	Honors Chemistry I	4
		CEM	182H	Honors Chemistry II	4
		CEM	185H	Honors Chemistry Laboratory	2
(6)	One of	the follow	ing grou	os of courses (8 credits):	
	(a)	CEM	251	Organic Chemistry I	3
	()	CEM	252	Organic Chemistry II	3
		CEM	255	Organic Chemistry Laboratory	2
	(6)				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 follow	/ing (3 or		
(7)	One of MTH			4 credits):	3
(7)	MTH	132	Calculu	4 credits): s I	3
(7)	MTH LB	132 118	Calculu Calculu	4 credits): s l s l	4
	MTH LB MTH	132 118 152H	Calculu Calculu Honors	4 credits): s l s l Calculus l	
(7) (8)	MTH LB MTH One of	132 118 152H the follow	Calculu Calculu Honors /ing (3 cre	4 credits): s I s I Calculus I edits):	4 3
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	MTH LB MTH One of STT STT	132 118 152H the follow 231 421	Calculu Calculu Honors ving (3 cre Statistic Statistic	4 credits): s I s I Calculus I edits): cs for Scientists cs I	4 3 3 3
	MTH LB MTH One of STT	132 118 152H the follow 231	Calculu Calculu Honors ving (3 cro Statistic	4 credits): s I s I Calculus I edits): cs for Scientists cs I	4 3 3
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(8)	MTH LB MTH One of STT STT MTH One of (a)	132 118 152H the follow 231 421 133 the follow PHY PHY PHY	Čalculu Calculu Honors ving (3 cro Statistic Statistic Calculu ving group 231 232 241	4 credits): s I s I Calculus I edits): cs for Scientists cs I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I	4 3 3 3 3 3
(8)	MTH LB MTH One of STT STT MTH One of (a)	132 118 152H the follow 231 421 133 the follow PHY PHY	Čalculu Calculu Honors <i>i</i> ng (3 cre Statistic Statistic Calculu <i>i</i> ng grou 231 232	4 credits): s I s I Calculus I edits): cs for Scientists cs I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular	4 3 3 3 3 3 3 4
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(8)	MTH LB MTH One of STT MTH One of (a) (b)	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB LB PHY	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers II Physics I Physics I Physics I Physics I Physics I Physics I Physics I-Mechanics	4 3 3 3 3 3 3 4 4 4 4 4
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(8) (9)	MTH LB MTH One of STT MTH One of (a) (b) (c) (d) (e)	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY LB LB PHY PHY	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics I Physics I- Honors Physics II- Electromagnetism	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4
(8) (9) The fol	MTH LB MTH One of STT MTH One of (a) (b) (c) (d) (e) lowing co	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY LB LB PHY PHY HY urses in t	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics I Physics I-Mechanics Honors Physics II-	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4
(8) (9) The fol Genetic	MTH LB MTH One of STT MTH One of (a) (b) (c) (d) (c) (d) (e) lowing co	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY PHY urses in t edits):	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H he Depar	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics I Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics I-Mechanics Honors Physics II- Electromagnetism tment of Microbiology and Molecular	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4
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(8) (9) The fol Genetic	MTH LB MTH One of STT MTH One of (a) (b) (c) (c) (d) (c) (d) (e) lowing co cs (19 cre All of th MMG	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY PHY urses in t edits): ne followir 301	Calculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H he Depar Introduc	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics I Physics II Honors Physics I-Mechanics Honors Physics II- Electromagnetism tment of Microbiology and Molecular	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4
(8) (9) The fol Genetic	MTH LB MTH One of STT MTH One of (a) (b) (c) (c) (d) (c) (d) (e) lowing co cs (19 cre All of th	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY PHY LB LB PHY PHY PHY LB LB PHY PHY PHY LB LB PHY PHY PHY PHY PHY PHY PHY PHY	Calculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H he Depar Introduc	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists II Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics II- Electromagnetism tment of Microbiology and Molecular s (13 credits): ctory Microbiology ctory Laboratory for General and	4 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 3
(8) (9) The fol Genetic	MTH LB MTH One of STT STT MTH One of (a) (b) (c) (d) (c) (d) (e) lowing co cs (19 cre All of th MMG MMG	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY PHY urses in t edits): ne followir 301 302	Calculu Calculu Honors ing (3 cre Statistic Statistic Calculu ing group 231 232 241 242 183 184 273 274 193H 294H he Depar Introduc	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics I Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics II- Electromagnetism tment of Microbiology and Molecular s (13 credits): ctory Microbiology ctory Laboratory for General and Allied Health Microbiology	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 3 1
(8) (9) The fol Genetic	MTH LB MTH One of STT STT MTH One of (a) (b) (c) (d) (c) (d) (e) lowing co cs (19 cre All of th MMG MMG	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY UTSES in t edits): ne followir 301 302 421	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H he Depar Introduc Introduc Prokary	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics II Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists II Physics for Scientists and Engineers I Physics for Scientists and Engineers II Physics I Physics I Physics I-Mechanics Honors Physics I-Mechanics Honors Physics II- Electromagnetism tment of Microbiology and Molecular s (13 credits): ctory Microbiology ctory Laboratory for General and Allied Health Microbiology	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 3 1 3
(8) (9) The fol Genetic	MTH LB MTH One of STT STT MTH One of (a) (b) (c) (d) (c) (d) (e) lowing co cs (19 cre All of th MMG MMG	132 118 152H the follow 231 421 133 the follow PHY PHY PHY PHY PHY PHY LB LB PHY PHY PHY urses in t edits): ne followin 301 302	Čalculu Calculu Honors ving (3 cre Statistic Statistic Calculu ving group 231 232 241 242 183 184 273 274 193H 294H he Depar Introduc Introduc Prokary	4 credits): s I s I Calculus I edits): cs for Scientists s I s II os of courses (6 or 8 credits) Introductory Physics I Introductory Physics I Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists I Physics for Scientists and Engineers I Physics for Scientists and Engineers I Physics I Physics I Physics I Physics II- Electromagnetism tment of Microbiology and Molecular s (13 credits): ctory Microbiology ctory Laboratory for General and Allied Health Microbiology	4 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 3 1

(2)	MMG	431 ho followi	Microbial Genetics ing courses (3 credits):	3
(2)	MMG	408	Advanced Microbiology Laboratory (W)	3
	MMG	408 494	Summer Undergraduate Research	5
	NING	434	Institute in Genomics (W)	3
(3)	One of t	he follow	ing two options (3 credits):	0
(0)	(a)	MMG	491 Current Topics in Microbiology	
	(u)		and Molecular Genetics	3
	(b)	MMG	492 Undergraduate Research Seminar	1
	(D)		he following courses:	
		MMG	499 Undergraduate Research	2
		MMG	499H Honors Research	2 2
	(c)	MMG	493 Professional Internship in Microbiology	2
	(0)		and Molecular Genetics	3
	The con	npletion o	f either of these three options fulfills the department's	Ũ
			requirement.	
One cou			e following areas (6 to 8 credits):	
(1)	CSS	455	Pollutants in the Soil Environment	3
(2)	FOR	340	Forest Ecology	3 4 3 3 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
(10)	PLB	400	Introduction to Bioinformatics	3 3 3 3 3 3 3 3 3 3 3 3
(10)	IBIO	357	Global Change Biology (W)	3

c.

- 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:

In item 3. a. (4) (d) delete the following course:				
CEM	186H	Honors	Chemistry Laboratory II	2
In item	3. a. (6)	delete the	e following course:	
ZOL	341	Fundar	nental Genetics	4
Add the	e followin	g course:		
IBIO	341	Fundar	nental Genetics	4
Replac	e item 3.	a. (7) witl	h the following:	
(a) (b)	the follov PHY PHY LB LB PHY	ving grou 231 232 273 274 183	ps of courses (6 to 8 credits) Introductory Physics I Introductory Physics II Physics I Physics II Physics for Scientists and Engineers I	3 3 4 4 4
	CEM In item ZOL Add the IBIO Replac One of (a)	CEM 186H In item 3. a. (6) ZOL 341 Add the followin IBIO 341 Replace item 3. One of the follow (a) PHY PHY (b) LB LB	CEM 186H Honors In item 3. a. (6) delete the ZOL 341 Fundar Add the following course: IBIO 341 Fundar Replace item 3. a. (7) with One of the following grou (a) PHY 231 PHY 232 (b) LB 273 LB 274	CEM 186H Honors Chemistry Laboratory II In item 3. a. (6) delete the following course: ZOL 341 Fundamental Genetics Add the following course: IBIO 341 Fundamental Genetics Replace item 3. a. (7) with the following: One of the following groups of courses (6 to 8 credits) (a) PHY 231 PHY 232 Introductory Physics I (b) LB 273 LB 274 Physics II

	(d) (e)	PHY PHY PHY PHY PHY	184 193H 294H 241 242	Physics for Scientists and Engineers II Honors Physics I – Mechanics Honors Physics II – Electromagnetism Physics for Cellular and Molecular Biologists I Physics for Cellular and Molecular Biologists II	4 4 4 4
(4)	In item	3. b. mak	e the follo	owing changes:	
	(a)	Change	the total	credits from '19' to '19 to 20'.	
	(b)	In item	(2) chang	e the total credits from '3' to '3 or 4'.	
	(c)	In item	(2) chang	e the credits of 'MMG 334' from '3' to '4'.	
	(d)	In item	(2) add th	e following course:	
		MMG	494	Summer Undergraduate Research Institute in Genomics (W)	3
(5)	Change	e item 3. k	o. (3) to th	e following:	
	One of (a)	the follow MMG	ving three 491	options (3 credits): Current Topics in Microbiology and Molecular Genetics	3
	(b)	MMG One of MMG MMG	492 the follow 499 499H	Undergraduate Research Seminar ing courses: Undergraduate Research Honors Research	1 2 2
	(c)	MMG	493	Professional Internship in Microbiology and Microbiology and Molecular Genetics	3
				of Microbiology 491, 493; or Microbiology 492 and 499 the department's capstone course requirement.	Ū
(6)	In item	3. c. dele	te the foll	owing courses:	
	CSS PLB ZOL	441 400 445		eeding and Biotechnology tion to Bioinformatics n (W)	3 3 3
	Add the	following	g courses		
	ANS CMSE CMSE CMSE CMSE CSS	404 201 202 410 411 451	Comput Comput Bioinfor Comput	tion to Quantitative Genetics ational Modeling and Data Analysis I ational Modeling and Data Analysis II matics and Computational Biology ational Medicine nology Applications for Plant Breeding	3 4 4 3 3
	IBIO	445	Evolutio	and Genetics	3 3

- 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: 2 (2) In item 3. a. (6) change the total credits from '8 to 10' to '6 to 8'. 3 (3) In item 3. a. (6) (a) delete the following courses: 1 PHY 251 Introductory Physics Laboratory I 1 (4) In item 3. a. (6) (c) delete the following courses: 1 PHY 252 Introductory Physics Laboratory II 1 (5) In item 3. a. (6) (c) delete the following courses: 1 PHY 192 Physics Laboratory for Scientists, I 1 (6) Add item 3. a. (6) (d) delete the following courses: 1 PHY 192 Physics Laboratory for Scientists, I 1 (6) Add item 3. a. (6) (e): 1 PHY 242 Physics for Cellular and Molecular Biologists I 4 (7) In item 3. b. (1) change the total credits from '13' to '10' and delete the following course: 4 MMG 408 Advanced Microbiology Laboratory (W) 3 (8) Renumber item 3. b. (2) to item 3. b. (3). 3 3 (9) Add a new item 3. b. (3) to the following; 3 3						
 (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 PHY 252 Introductory Physics Laboratory II (4) In item 3. a. (6) (c) delete the following courses: PHY 191 Physics Laboratory for Scientists, I PHY 192 Physics Laboratory for Scientists, II (5) In item 3. a. (6) (d) delete the following courses: PHY 191 Physics Laboratory for Scientists, II 1 (6) Add item 3. a. (6) (e): PHY 241 Physics Laboratory for Scientists, II 1 (7) In item 3. a. (6) (e): PHY 241 Physics for Cellular and Molecular Biologists I 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): One of the following courses (3 credits): MMG 408 Advanced Microbiology Laboratory (W) 3 (10) Change item 3. b. (2): One of the following either (a), (b), or (c) (3 credits): (a) MMG 491 Current Topics in Microbiology and Molecular Genetics and Molecular Genetics and One of the following courses: (b) MMG 492 Undergraduate Research Seminar and One of the following courses: (c) MMG 493 Professional Internship in Microbiology 492 and Theorem 500 (499 491, 493, or Microbiology 491, 493, or Microbiology 492 and Theorem 500 (500 (500 (500 (500 (500 (500 (500	(1)	In item	3. a. (4) ((d) delete	the following course:	
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 (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 					Current Topics in Microbiology and Molecular	3
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		(b)		492		
		(c)	One of MMG MMG MMG The col	499 499H 493 mpletion	Undergraduate Research Honors Research Professional Internship in Microbiology and Molecular Genetics of Microbiology 491, 493, or Microbiology 492 and	2

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

MMG 463 Medical Microbiology

Add the following courses:

MMG	365	Medical Microbiology	3
MMG	465	Advanced Medical Microbiology	3

Effective Spring 2022.

- 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:

b.

c.

- 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

DIVID	001		3
MMG	833	Microbial Genetics	3
MMG	835	Eukaryotic Molecular Genetics	3
One cou	irse must	focus on Cell Biology or Cell Physiology and include	one of the
following	g courses	or an approved equivalent as approved by the Direct	tor of

Gradua	ate Studi	ies.	
BMB	802	Metabolic Regulation and Signal	
		Transduction	3
MMG	801	Integrative Microbial Biology	4
MMG	825	Cell Structure and Function	3
Other a	approved	d 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
ete three	special	topics graduate seminar courses (MMG 803,	

 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.

- 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)	(2) Replace item 1. c. delete the following courses:						
	ZOL ZOL	891 895	Current Topics in Ecology and Evolution Seminar	1 1			
	Add the following courses:						
	IBIO IBIO	891 895	Current Topics in Ecology and Evolution Seminar	1 1			

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
 - (b) Delete the following course:

OST 580 Respiratory System

Add the following course:

OST 580 Respiratory System 7

1

6

- (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

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 o	f the follo	wing 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)

(2)

I	MTH MTH and	103A 103B	College Algebra I College Algebra II	3 3
(One of th	ne followi	ng:	
1	MTH	101	Quantitative Literacy I	3
1	MTH	102	Quantitative Literacy II	3
I	MTH	114	Trigonometry	3
1	MTH	201	Elementary Mathematics for Teachers I	3
9	STT	200	Statistical Methods	3
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.

veterin	ary nur	sing 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
Veterin	ary Nur	sing Elective Group 2. Complete 15 credits in courses	from one
of the fo	ollowing	concentrations. All course selections must be approved	by the
		ing Program.	
Busine	ss Com	munication	
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
Genera	I 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	2000 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			3
	307	Animal Reproduction	
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			2
	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
Genera	l Zoo an	d Wildlife	
EPI	390	Disease in Society: Introduction to Epidemiology	
<u> </u>	000	and Public Health	4
FW	101	Fundamentals of Fisheries and Wildlife Ecology	7
	101		2
	440	and Management	3
FW	110	Conservation and Management of Marine	_
		Resources	3
FW	181	Introduction to Science, Technology, the Environmen	t
		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		3
		Conservation Biology	
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
		Ecological Aspects of Animal Behavior (W)	4 3
IBIO	415		
NEU	300	Neurobiology	3
		nd Policy	0
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	Ũ
ANS	124		~
		Food Systems	2
ANS	418	Animal Agriculture and the Environment	3
ANS	424	Sustainable Agriculture and Food Systems:	
	727		2
		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
			5
CSS	124	Introduction to Sustainable Agriculture and	
		Food Systems	1
CSS	222	New Horizons in Biotechnology	2
EC	201	Introduction to Microeconomics	3
			5
EC	202	Introduction to Macroeconomics	3
EPI	390	Disease in Society: Introduction to Epidemiology	
		and Public Health	4
FW	121		•
ΓVV	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
			3 3
HRT	251	Organic Farming Principles and Practices	3
PHL	380	Nature of Science	3
SOC	161	International Development and Change	3 3
SOC	252	Introduction to Environmental Sociology	3
			5
		nd Toxicology	
ANS	407	Food and Animal Toxicology	3
ANS	427	Environmental Toxicology and Society	3
BMB	200	Introduction to Biochemistry	4
			4
EPI	390	Disease in Society: Introduction to Epidemiology	
		and Public Health	4
NEU	300	Neurobiology	3
PHL	380	Nature of Science	3
			5
PHM	350	Introductory Human Pharmacology	3 3
PHM	351	Fundamentals of Drug Safety	3
PHM	431	Pharmacology of Drug Addiction	3
PHM	450	Introduction to Chemical Toxicology	3
			3
FCOlogy		source Management	
		source Management	
AFRE	265	Ecology and Economics	3
AFRE	265	Ecology and Economics	3
		Ecology and Economics Introduction to Sustainable Agriculture and	
AFRE ANS	265 124	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems	
AFRE ANS ANS	265	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment	3 2 3
AFRE ANS	265 124	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment	
AFRE ANS ANS	265 124 418	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems	2 3
AFRE ANS ANS FOR	265 124 418 419	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management	
AFRE ANS ANS	265 124 418	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the	2 3 4
AFRE ANS ANS FOR	265 124 418 419 181	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy	2 3 4 3
AFRE ANS ANS FOR	265 124 418 419	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy	2 3 4 3
AFRE ANS ANS FOR FW FW	265 124 418 419 181 364	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving	2 3 4 3 3
AFRE ANS ANS FOR FW FW FW	265 124 418 419 181 364 413	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques	2 3 4 3 3
AFRE ANS FOR FW FW FW FW FW	265 124 418 419 181 364 413 417	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management	2 3 4 3 3 3 3 3
AFRE ANS ANS FOR FW FW FW	265 124 418 419 181 364 413	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques	2 3 4 3 3 3 3 3 3 3 3
AFRE ANS FOR FW FW FW FW FW	265 124 418 419 181 364 413 417	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease	2 3 4 3 3 3 3 3 3 3 3
AFRE ANS FOR FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory	2 3 4 3 3 3 3 3 1
AFRE ANS FOR FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L 424	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management	2 3 4 3 3 3 3 3 3 3 3
AFRE ANS FOR FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife	2 3 3 3 3 3 3 3 1 4
AFRE ANS FOR FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L 424	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management	2 3 3 3 3 3 3 1 4 3
AFRE ANS FOR FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L 424 434	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W)	2 3 3 3 3 3 3 1 4 3
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423L 424 434 463	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology	2 3 3 3 3 3 3 3 1 4 3 3
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW BIO	265 124 418 419 181 364 413 417 423 423 424 434 463 355	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology	2 3 3 3 3 3 3 1 4 3 3 3 3
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW IBIO IBIO	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W)	2 3 3 3 3 3 3 3 1 4 3 3
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW IBIO IBIO	265 124 418 419 181 364 413 417 423 423 424 434 463 355	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment	234 3333314 3331
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW IBIO IBIO	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment	234 3333314 3331
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW BIO IBIO Animal AFRE	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I	234 3333314 33331 3331
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW BIO IBIO Animal AFRE ANS	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130 110	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture	2 3 4 3 3 3 3 3 1 4 3 3 3 1 3 3 3 1
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW BIO IBIO IBIO Animal AFRE ANS ANS	265 124 418 419 181 364 413 417 423 423 423 424 434 463 355 355L Manager 130 110 110L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Laboratory	2 3 4 3 3 3 3 3 1 4 3 3 3 1 3 3 1
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW BIO IBIO Animal AFRE ANS	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130 110 110L 134	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Introductory Animal Agriculture Laboratory Dairy Production I	23 4 3333314 3331 3313
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW BIO IBIO IBIO Animal AFRE ANS ANS	265 124 418 419 181 364 413 417 423 423 423 424 434 463 355 355L Manager 130 110 110L	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Introductory Animal Agriculture Laboratory Dairy Production I	23 4 3333314 3331 3313
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130 110 110L 134 222	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Introductory Beef Cattle Management	23 4 3333314 3331 3313
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130 110 110L 134 222 233	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Introductory Beef Cattle Management Dairy Feed Management	23 4 3333314 3331331 331333
AFRE ANS FOR FW FW FW FW FW FW FW FW FW FW FW FW FW	265 124 418 419 181 364 413 417 423 423 424 434 463 355 355L Manager 130 110 110L 134 222	Ecology and Economics Introduction to Sustainable Agriculture and Food Systems Animal Agriculture and the Environment Applications of Geographic Information Systems to Natural Resources Management Introduction to Science, Technology, the Environment and Public Policy Ecological Problem Solving Wildlife Research and Management Techniques Wetland Ecology and Management Principles of Fish and Wildlife Disease Principles of Fish and Wildlife Disease Laboratory Population Analysis and Management Human Dimensions of Fisheries and Wildlife Management (W) Wildlife Disease Ecology Ecology Ecology Laboratory (W) ment Farm Management I Introductory Animal Agriculture Introductory Animal Agriculture Introductory Beef Cattle Management	23 4 3333314 3331 3313

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
Anima	I Produc	ts 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

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. <u>Request the use of ET-Extension to postpone grading.</u> <u>The work for the course must be completed and the final grade reported within 1</u> <u>semester after the end of the semester of enrollment.</u> 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 Macromolocular 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 consurrently RB: (BMB 461 and BMB 462) or or equivalent background is recommended Techniquee of isolation and characterization of macromoloculos. Computer use in etructure function analysis of macromoloculos. 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 Conomice Genomics (W)
	Spring of every year. 3(3-0) P: (MMC 431) <u>P: MMG 431</u> 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 geneme sequence databases. Applications to gene expression and phylogenetic analysis. <u>High-throughput DNA sequencing and the study of</u>
	<u>genome structure, replication, evolution. Application of bioinformatics analyses for</u> functional annotation, genetic diversity, ecology, and human health. Effective Fall 2015 <u>Effective Summer 2021</u>
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
NEW	Microbiology and Molecular Genetics. Approval of department. 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. <u>Request the use of ET-Extension to postpone grading.</u> <u>The work for the course must be completed and the final grade reported within 1</u>
	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. <u>Summer of every year.</u> 3(3-0) Plant structure, function, development, genetics, diversity and ecology. <u>Plant structure,</u> <u>function, development, genetics, diversity and ecology.</u> <u>Offered first half of semester.</u> SA: BOT 105 <u>Effective Fall 2014</u> <u>Effective Summer 2021</u>

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. <u>Request the use of the Pass-No Grade (P-N) system.</u> <u>Request the use of ET-Extension to postpone grading.</u> <u>The work for the course must be completed and the final grade reported within 1</u> <u>semester after the end of the semester of enrollment.</u> 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. <u>Request the use of the Pass-No Grade (P-N) system.</u> <u>Request the use of ET-Extension to postpone grading.</u> <u>The work for the course must be completed and the final grade reported within 1</u> <u>semester after the end of the semester of enrollment.</u> 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. <u>Request the use of the Pass-No Grade (P-N) system.</u> <u>Request the use of ET-Extension to postpone grading.</u> <u>The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.</u> Effective Spring 2022