MICHIGAN STATE UNIVERSITY
University Committee on Curriculum

SUBCOMMITTEE A – AGENDA

170 Administration Building
September 17, 2009
1:30 p.m.

PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Request to change the requirements for the **Bachelor of Science** degree in **Food Science** in the Department of Food Science and Human Nutrition.

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

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

         (a) Change the total credits from '49' to '53'.

         (b) Delete the following courses:

FSC	410	Sensory Assessment of Foods	3

         (c) Add the following courses:

FSC	410	Sensory Analysis and Consumer Research	3
MMG	301	Introductory Microbiology	3
MMG	302	Introductory Laboratory for General and Allied Health Microbiology	1

      (2) Reletter item b. to item c.

      (3) Add the following item 3. b.:

Two of the following courses (6 credits):

FSC	430	Food Processing: Fruits and Vegetables	3
FSC	431	Food Processing: Cereals	3
FSC	432	Food Processing: Dairy Foods	3
FSC	433	Food Processing: Muscle Foods	3

      (4) Replace item c. with the following:

One of the following concentrations: 19 to 26

Basic Food Science (25 credits):

(1) All of the following courses (16 credits):

BMB	401	Basic Biochemistry	4
CEM	251	Organic Chemistry I	3
CEM	252	Organic Chemistry II	3
CEM	255	Organic Chemistry Laboratory	2
STT	201	Statistical Methods	4

(2) Nine credits from the following courses:

ANS	407	Food and Animal Toxicology	3
ANS	417	Topics in Toxicology	1
CEM	262	Quantitative Analysis	3
CEM	333	Instrumental Methods and Applications	3
CEM	383	Introductory Physical Chemistry I	3
FSC	342	Food Safety and Hazard Analysis Critical Control Point Program	3
FSC	421	Food Laws and Regulations	3
FSC	423	Functional Foods and Human Health	3
MMG	409	Eukaryotic Cell Biology	3
MMG	425	Microbial Ecology	3
MMG	431	Microbial Genetics	3
MMG	445	Microbial Biotechnology	3
MMG	451	Immunology	3
PHM	350	Introductory Human Pharmacology	3

	PHM	450	Introduction to Chemical Toxicology	3

The Basic Food Science concentration fills many, but not all, of the minimum requirements for admission to professional schools. Students interested in preparing for post-graduate professional programs should consult with a preprofessional advisor in the College of Natural Science. Admission requirements of professional schools vary and the student is responsible for reviewing the requirements of each school of interest and consulting regularly with an advisor.

Food Business and Industry (23 credits):

(1) All of the following courses (17 credits):

ACC	230	Survey of Accounting Concepts	3
BMB	200	Introduction to Biochemistry	4
CEM	143	Survey of Organic Chemistry	4
MKT	327	Introduction to Marketing	3
STT	315	Introduction to Probability and Statistics for Business	3

(2) Two of the following courses (6 credits):

ABM	100	Decision-making in the Agri-Food System	3
ABM	222	Agribusiness and Food Industry Sales (W)	3
ABM	435	Financial Management in the Agri-Food System	3
FI	311	Financial Management	3
FIM	335	Food Marketing Management	3
MKT	302	Consumer and Organizational Buyer Behavior	3

Either Finance 311 or Agribusiness Management 435, but not both of the courses, may be used to satisfy requirement (2) for the **Food Business and Industry** concentration.

Food Packaging (26 credits):

All of the following courses:

BMB	200	Introduction to Biochemistry	4
CEM	143	Survey of Organic Chemistry	4
PKG	101	Principles of Packaging	3
PKG	221	Packaging with Glass and Metal	3
PKG	322	Packaging with Paper and Paperboard	4
PKG	323	Packaging with Plastics	4
STT	201	Statistical Methods	4

Food Technology (19 credits):

(1) All of the following courses (10 credits):

BMB	200	Introduction to Biochemistry	4
CEM	143	Survey of Organic Chemistry	4
FSC	420	Quality Assurance	2

(2) Nine credits from the following courses:

FSC	342	Food Safety and Hazard Analysis Critical Control Point Program	3
FSC	421	Food Laws and Regulations	3
FSC	430	Food Processing: Fruits and Vegetables	3
FSC	431	Food Processing: Cereals	3
FSC	432	Food Processing: Dairy Foods	3
FSC	433	Food Processing: Muscle Foods	3
HB	100	Introduction to Hospitality Business	2
HB	265	Food Management: Safety and Nutrition	3
HB	267	Management of Food and Beverage Systems	3
HNF	300	Experimental Approaches to Food	4

Courses selected to meet this requirement may not be used to fulfill requirement 3. b. above.

Effective Spring 2010.

2. Request to establish an **Agricultural Technology Certificate** in **The Institute of Agricultural Technology** in **Grounds Management**.

a. **Background Information:**

The Institute of Agricultural Technology (IAT) provides Michigan State University with a unique niche in its capacity to help educate Michigan citizens and to help diversify the Michigan economy. The acceleration of the vision of the IAT is an initiative to develop partnerships with community colleges throughout Michigan to offer IAT programs at the local level.

Wayne County Community College District (WCCCD) and IAT are collaborating to offer a Grounds Management Agricultural Technology Certificate in association with the WCCCD Facilities Maintenance program. Students will be able to complete the IAT Certificate in Grounds Management and/or the WCCCD Certificate in Facilities Maintenance. The program is designed so that both certificates may be completed in four semesters. Students may also complete an Associate in Applied Science Degree in Facilities Maintenance at WCCCD with an additional 18 credits.

At its December 2008 meeting, the Board of the Michigan Sports Turf Managers Association heartily endorsed this new program and the concept of completing both certificate programs. Persons possessing credentials in both areas would be highly sought after by commercial property management entities and large corporations, especially in tight economic times because one person could serve the role now being performed by two persons. Persons with both sets of credentials are needed nationally, and it would be advantageous to launch a program at WCCCD given the depressed economic conditions in Detroit.

A broad stakeholder group that includes local Michigan State University Extension staff; Agriscience teachers from Detroit, Wyandotte and Oakland County, whose students are natural feeders into the program; industry groups; and community groups from Detroit including Greening of Detroit and NEXT Detroit have positively reviewed the program in November, 2008.

b. **Academic Programs Catalog Text:**

The Grounds Management certificate is delivered in partnership between Wayne County Community College District and the Michigan State University Institute of Agricultural Technology. It is designed for persons interested in careers managing commercial, private, school, or community athletic facilities and landscapes.

Graduates of the program will receive a certificate from the Michigan State University Institute of Agricultural Technology and will have the opportunity to complete a test to become a certified pesticide applicator with the Michigan Department of Agriculture. Additional course work may lead to a Certificate in Grounds Management from Michigan State University and a Certificate in Facilities Maintenance from Wayne County Community College District, making the graduate more qualified to manage both indoor and outdoor facilities. Students may continue their course work to obtain an Associate in Applied Science Degree from Wayne County Community College District in addition to the certificate from Michigan State University.

Requirements for Grounds Management

1. All of the following courses (25 credits):

AT	291	Special Topics in Agricultural Technology	1
AT	293	Professional Internship in Agricultural Technology	3
CSS	202	The World of Turf	2
CSS	203	Applied Turf Management	1
CSS	210	Fundamentals of Soil Science	3
CSS	269	Turfgrass Strategies: Integration and Synthesis	2
CSS	292	Management of Turfgrass Weeds	3
ENT	111	Basics of Applied Entomology	2
HRT	214	Landscape and Turfgrass Business Operations	2
HRT	218	Landscape Irrigation	3
PLP	104	Applied Plant Pathology for Ornamentals and Turf	3

2. Complete 25 credits of course work from Wayne County Community College District as approved by the student's academic advisor.

Effective Spring 2010.

COLLEGE OF ENGINEERING

1. Request to change the requirements for the **Bachelor of Science** degree in **Biosystems Engineering** in the Department of Biosystems and Agricultural Engineering.

   The concentrations in the Bachelor of Science degree in Biosystems Engineering will be noted on the student's academic record when the requirements for the degree have been completed.

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

      (1) In item 3. d. add the following courses:

BE	469	Sustainable Bioenergy Systems	3
CHE	468	Biomass Conversion Engineering	3

      (2) Under the heading **Concentrations in Biosystems Engineering** add the following concentration:

Bioenergy Engineering
To earn a Bachelor of Science degree in Biosystems Engineering with a bioenergy engineering concentration, students must complete requirements 1., 2., and 3. above and the following:

1.	All of the following courses (12 credits):			
	BE	469	Sustainable Bioenergy Systems	3
	CHE	468	Biomass Conversion Engineering	3
	CSS	467	Bioenergy Feedstock Production	3
	MMG	445	Microbial Biotechnology	3
2.	One of the following courses (3 or 4 credits):			
	CHE	481	Biochemical Engineering	3
	CHE	882	Advanced Biochemical Engineering	3
	CHE	883	Multidisciplinary Bioprocessing Laboratory	3
FW	829	The Economics of Environmental Resources 3		
	GLG	471	Applied Geophysics	4
	MC	450	International Environmental Law and Policy	3
	ME	417	Design of Alternative Energy Systems	3

   Effective Spring 2010

2. Request to phase out and discontinue the **Doctor of Philosophy** degree in **Environmental Engineering-Environmental Toxicology** in the Department of Civil and Environmental Engineering. The University Graduate Council (UGC) will consider this request at its September 14, 2009 meeting.

   No new students are to be admitted to the program effective Spring 2010. No students are to be readmitted to the program effective Spring 2010. Effective Spring 2010, coding for the program will be discontinued and the program will no longer be available in the Department of Civil and Environmental Engineering. Students who have not met the requirements for the Doctor of Philosophy degree in Environmental Engineering-Environmental Toxicology through the Department of Civil and Environmental Engineering prior to Spring 2010 will have to change their major.

LYMAN BRIGGS COLLEGE

1. Request to change the requirements for the **Bachelor of Science** degree in **Lyman Briggs College**.

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

      (1) In item 1., paragraph five, 'The University's Tier II writing requirement…', change English 483 to English 473A.

      (2) In item 3. a. (5) (c) change English 483 to English 473A.

   Effective Fall 2010.

2. Request to recognize the **Fisheries and Wildlife** major leading to the Bachelor of Science degree in the Department of Fisheries and Wildlife as a **Coordinate Major in Lyman Briggs College**.

   Effective Spring 2010.

COLLEGE OF NATURAL SCIENCE

1. Request to change the requirements for the **Master of Science** degree in **Biomedical Laboratory Operations** in the Biomedical Laboratory Diagnostics Program. The University Graduate Council (UGC) will consider this request at its September 14, 2009 meeting.

   a. Under the heading **Requirements for the Master of Science Degree in Biomedical Laboratory Operations** make the following changes:

      (1) Delete item 6.

   Effective Spring 2010.

2. Request to change the requirements for the **Bachelor of Science** degree in **Biochemistry and Molecular Biology** in the Department of Biochemistry and Molecular Biology.

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

      (1) In item 3. b. (1) replace 'Seven additional credits in biology courses at the 300-400 level' with 'Ten additional credits in approved biology courses at the 300-400 level'.

      (2) Delete item 3. b. (4).

      (3) Renumber item 3. b. (5) to item 3. b. (4).

      (4) Renumber item 3. b. (6) to item 3. b. (5) and replace with the following:

      Both of the following courses (8 credits):

PHY	183	Physics for Scientists and Engineers I	4
PHY	184	Physics for Scientists and Engineers II	4

      (5) Delete item 3. b. (7).

   Effective Spring 2010.

3. Request to establish a **Bachelor of Science** degree in **Geobiology** in the Department of Geological Sciences.

a. **Background Information:**

The proposed program in Geobiology will coincide with and strengthen strategic directions proposed by the Department of Geological Sciences in Spring 2004. It fits the context of a departmental shift to an "Earth Science Systems" focus and identity. This program also aligns the department with peer institutions, most recently Pennsylvania State University, among others, to capture undergraduate students interested in this emerging area of the geosciences, and plays to the strength of faculty already positioned within the department. It adds flexibility and choice for students whose interests lie at the intersection of biology, ecology, evolution, and geology, and prepares students for graduate programs in a variety of fields, including both paleontology and environmental geosciences.

b. **Academic Programs Catalog Text:**

The Bachelor of Science degree in Geobiology is designed to provide an integrated approach to life and earth science in a way that bridges the gap between the biological and physical sciences. This broad level of training allows graduates of the program to pursue a broad range of post-graduate options.

Requirements for the Bachelor of Science Degree in Geobiology

1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Geobiology.

   The University's Tier II writing requirement for the Geobiology major is met by completing one of the following courses: Geological Sciences 431 or 492. Those courses are referenced in item 3. b. below.

   Students who are enrolled in the College of Natural Science may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading Graduation Requirements in the College statement. Certain courses referenced in requirement 3. below may be used to satisfy the alternative track.

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

   The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.

3. The following requirements for the major:

				CREDITS
a.	The following courses outside the Department of Geological Sciences (40 or 41 credits):			
(1)	All of the following courses (37 credits):			
	BS	110	Organisms and Populations	3
	BS	111	Cells and Molecules	3
	BS	111L	Cell and Molecular Biology Laboratory	2
	CEM	141	General Chemistry	4
	CEM	142	General and Inorganic Chemistry	3
	CEM	161	Chemistry Laboratory I	1
	CEM	162	Chemistry Laboratory II	1
	CEM	251	Organic Chemistry I	3
	CEM	252	Organic Chemistry II	3
	CEM	255	Organic Chemistry Laboratory	2
	MTH	132	Calculus I	3
	PHY	231	Introductory Physics I	3
	PHY	232	Introductory Physics II	3
	PHY	251	Introductory Physics Laboratory I	1
	PHY	252	Introductory Physics Laboratory II	1
(2)	One of the following courses (3 or 4 credits):			
	MTH	133	Calculus II	4

		STT	201	Statistical Methods	4
		STT	231	Statistics for Scientists	3
		STT	421	Statistics I	3
b.	One of the following groups (6 to 10 credits):				
	(1)	BMB	401	Basic Biochemistry	4
		Or			
		BMB	461	Biochemistry I	3
		BMB	462	Biochemistry II	3
		And			
		MMG	426	Biogeochemistry	4
	(2)	MMG	301	Introductory Microbiology	3
		MMG	425	Microbial Ecology	3
	(3)	ZOL	341	Fundamental Genetics	4
		ZOL	445	Evolution (W)	3
	(4)	BMB	401	Basic Biochemistry	4
		ZOL	341	Fundamental Genetics	4
c.	One of the following courses (3 or 4 credits):				
	ANP	440		Hominid Fossils	3
	ENT	404		Fundamentals of Entomology	3
	FW	471		Ichthyology	4
	PLB	335		Plants through Time	3
	PLB	418		Plant Systematics	3
	ZOL	306		Invertebrate Biology	4
	ZOL	353		Marine Biology (W)	4
	ZOL	355		Ecology	3
	ZOL	360		Biology of Birds	4
	ZOL	365		Biology of Mammals	4
	ZOL	384		Biology of Amphibians and Reptiles (W)	4
d.	All of the following courses in the Department of Geological Sciences (33 credits):				
	(1)	GLG	201	The Dynamic Earth	4
		GLG	304	Physical and Biological History of the Earth	4
		GLG	321	Mineralogy and Geochemistry	4
		GLG	431	Sedimentology and Stratigraphy (W)	4
		GLG	433	Vertebrate Paleontology	4
		GLG	434	Evolutionary Paleobiology	4
		GLG	492	Senior Experience in Earth Sciences (W)	1

(2) Eight additional credits in Geological Sciences courses at the 300–400 level. Plant Biology 335, and Microbiology and Molecular Genetics 426 may be used to satisfy either the requirements for the major or the requirements referenced under the heading Graduation Requirements in the College statement, but cannot be used to meet both of those requirements. Plant Biology 335 and Microbiology and Molecular Genetics 426 may be used in fulfillment of requirement 3. d. if they are not used to fulfill either requirement 3. b. or 3. c. above.

The completion of Geological Sciences 492 fulfills the department's capstone course requirement.

Effective Spring 2010.

COLLEGE OF VETERINARY MEDICINE

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

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

      (1) In item 2., change the total credits from '101' to '102'.

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

VM	270	Veterinary Technician Health Care Development	1
VM	285	Clinical Nutrition for Veterinary Technologists	1
VM	310	Advanced Clinical Pathology Techniques	1

      Add the following courses:

VM	205	Preventative Animal Health Care for Veterinary Technicians	3
VM	270	Advanced Skills Development for Veterinary Technicians	1

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

ANS	404	Advanced Genetics of Farm Animals	2
ANS	407L	Toxicology Methods Laboratory	2
ANS	413	Non-Ruminant Nutrition	4
EPI	390	Disease in Society: An Introduction to Epidemiology and Public Health	3
FW	205	Principles of Fisheries and Wildlife Management	3
LCS	412	Hazard Analysis and Critical Control Points in Production Medicine	2
MT	212	Fundamentals of Laboratory Analysis	3

      Add the following courses:

ANS	404	Advanced Animal Genetics	2
ANS	413	Monogastric Animal Nutrition	3
EPI	390	Disease in Society: An Introduction to Epidemiology and Public Health	4

      (4) In item 2. d. add the following courses:

VM	285	Clinical Nutrition for Veterinary Technologists	1
VM	310	Advanced Clinical Pathology Techniques	1

Effective Spring 2010.

PART II - NEW COURSES AND CHANGES

COLLEGE OF ENGINEERING

BE 477 Food Engineering: Fluids
Fall of every year. 3(2-2) Interdepartmental with Food Science. ~~P: BE 350 and BE 351~~ P: BE 350 and BE 351 and BE 360

Unit operations, process engineering, equipment, and industrial practices of the food industry. Manufactured dairy products: thermal processing, pipeline design, heat exchange, evaporation, dehydration, aseptic processing, membrane separation, cleaning, and sanitation.
SA: FE 465
~~Effective Summer 2006~~ Effective Fall 2009

~~MSE 466~~
MSE 466L Design and Failure Analysis (W)
Spring of every year. 3(2-3) ~~P: (MSE 250) and completion of Tier I writing requirement~~ P: ((MSE 331 and (MSE 381 or concurrently))or approval of department) and completion of Tier I writing requirement ~~RB: MSE 320 and MSE 331 R: Open only to seniors in the College of Engineering.~~ R: Open to seniors in the College of Engineering.

Modes and causes of failure in mechanical components and role of design. Non-destructive evaluation. Legal and economic aspects of materials failure. Student projects.
SA: MSM 466
~~Effective Fall 2005~~ Effective Spring 2010

COLLEGE OF HUMAN MEDICINE

~~MED 629~~
HM 629 ~~Leadership in Medicine for Underserved or Vulnerable Communities~~
Leadership in Medicine for Underserved/Vulnerable Elective
Spring of every year. 6 credits. P: PHD 600 and MED 608 and FMP 608 and HM 621 R: Open to graduate-professional students in the College of Human Medicine. Approval of college.

Iissues involved in securing access to medical care and community resources for families in medically underserved communities.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
SA: MED 629
~~Effective Summer 2007~~ Effective Summer 2010

~~MED 631~~
HM 631 Advanced Leadership in Medicine for Underserved or Vulnerable Communities
Spring of every year. 6 credits. ~~P: HM 621 and MED 629~~ P: HM 621 and HM 629 R: Open to graduate-professional students in the College of Human Medicine. Approval of college.

Continuation of MED 629. Medical care of an underserved or vulnerable population in a rural, urban, or international setting. Development of abilities to intervene in the public health issues of this population.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
SA: MED 631
~~Effective Summer 2007~~ Effective Summer 2010

HM 640 Service Learning In the Community
Fall of every year. Spring of every year. Summer of every year. 1(1-0) A student may earn a maximum of 1 credit in all enrollments for this course. R: Open to graduate-professional students in the College of Human Medicine.

NEW Student will need to demonstrate preparation and planning to provide services which respond to community need; participate for 40 hours with community organization to provide beneficial services; demonstrate reflectivity on participation in services.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Fall 2009

HM 830 Practical Applications of Public Health Law
Spring of even years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 RB: Academic or professional background in public health and/or public health related discipline R: Open to students in the Public Health major or approval of college.

NEW Overview of legal basis of public health authority, use of law to direct public health practice.
Effective Fall 2009

HM 831 Communicable Disease in Public Health
Fall of even years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 and HM 803 RB: Academic or professional background in public health and/or public health related discipline, undergraduate level math or statistics coursework R: Open to students in the Public Health major or approval of college.

NEW Fundamentals of communicable disease transmission; overview of methods for prevention and control of communicable disease; emphasis on agents/organisms of public health significance.
Effective Fall 2009

HM 832 Global Public Health
Spring of even years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 RB: Academic or professional background in public health and/or public health related discipline, undergraduate level math or statistics coursework R: Open to students in the Public Health major or approval of college.

NEW Factors and dynamics that affect global public health. Application of public health principles and policies in international settings. Incorporation of cultural dynamics into public health practice.
Effective Fall 2009

HM 833 Introduction to Pharmaceutical Counterfeiting and Public Health
Fall of odd years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 RB: Academic or professional background in public health and/or public health related discipline R: Open to students in the Public Health major or approval of college.

NEW Introductory course establishing the general phriciples of counterfeiting, counterfeit pharmaceuticals, and how it impacts public health. Scope, policy, supply chain management, and health effects are examined using current case examples.
Effective Fall 2009

HM 834 Advanced Counterfeit Pharmaceuticals Readings
Spring of even years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 and HM 833 RB: Academic or professional background in public health and/or public health related discipline R: Open to students in the Public Health major or approval of college.

NEW Advanced topics on the impact of counterfeit pharmaceuticals on public health.
Effective Fall 2009

HM 835 Independent Study in Public Health
Fall of every year. Spring of every year. Summer of every year. 1 to 9 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Open to students in the Public Health major or approval of college.

NEW Independent study in areas relevant to public health.
Effective Fall 2009

HM 837 Poverty and Public Health
Fall of even years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. P: HM 801 RB: Academic or professional background in public health and/or public health related discipline, undergraduate level math or statistics coursework R: Open to students in the Public Health major or approval of college.

NEW This course provides an in-depth examination of the concepts of health and poverty and their interrelatedness from a global and public health perspective. The roles of international agencies, national policy, gender, socioeconomic status, race, ethnicity, culture, access to resources, and conflict will be considered in this examination of poverty and health. The profound centrality of poverty to the health of populations, the role of public health programs in the achievement and maintenance of healthy populations and in the struggle to help eliminate poverty will be primary focuses of the cour
Effective Fall 2009

PHD 609 Pediatric Genetics Clerkship
Fall of every year. Spring of every year. Summer of every year. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Human Medicine.

NEW To understand the vast influence of genetic determinants in many fields of medicine and become familiar with the genetic evaluation process.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Fall 2009

LYMAN BRIGGS COLLEGE

LB 155 Introduction to Quantitative Science and Research
Fall of every year. 3(2-3) P: (MTH 1825 or concurrently) or (MTH 103 or concurrently) R: Open to freshmen in the Lyman Briggs College.

NEW Exploration of fundamental chemistry, biology, physics, mathematics and statistics focusing on quantitative analysis and research.
Effective Fall 2009

COLLEGE OF NATURAL SCIENCE

~~NSC 201~~ ~~Science Problem Solving Seminar I~~
NSC 100 Drew Freshman Seminiar
Fall of every year. 2(2-0) P: (MTH 1825 or concurrently) or (MTH 116 or concurrently) or (MTH 132 or concurrently) R: Approval of college.

~~Problem solving principles and strategies used in the disciplines of science and mathematics. Activities reflecting the types of problems encountered.~~ Academic and non-academic skills and strategies for successful college transition.
SA: NSC 201
~~Effective Summer 2000~~ Effective Summer 2010

~~NSC 202~~ ~~Science Problem Solving Seminar II~~
NSC 200 Drew Sophomore Seminar
Fall of every year. ~~Spring of every year.~~ 2(2-0) ~~P: NSC 201~~ P: NSC 100 or approval of college R: Approval of college.

~~Continuation of NSC 201.~~ Career exploration and preparation through service-learning experience.
~~Effective Summer 2000~~ Effective Summer 2010

ISB 200 History of Life

Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LBS 117 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LB 118 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test

Life from its origin to the dawn of human history. Living things as both the products of evolutionary processes and as a major force driving evolution and altering the environment of planet earth.

~~Effective Fall 2003~~ Effective Fall 2009

ISB 201 Insects, Globalization, and Sustainability

Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LBS 117 or concurrently) or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LB 118 or concurrently) or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test

The relationship between insects, human society, and the environment with an emphasis on ecological and evolutionary processes. Critical evaluation of current regional and global environmental problems and how they are effecting the development of a sustainable society.

~~Effective Fall 2005~~ Effective Fall 2009

ISB 202 Applications of Environmental and Organismal Biology

Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LBS 117 or concurrently) or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LB 118 or concurrently) or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test

Historical and recent development of ideas about behavior, ecological, and evolutionary processes. Critical evaluation of the use and misuse of human understanding of nature, emphasizing recent findings.

~~Effective Fall 2003~~ Effective Fall 2009

ISB 204 Applications of Biomedical Sciences

Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LBS 117 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: ((MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 116 or concurrently) or (LB 118 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test

Historical and recent development of knowledge about cellular developmental or genetic processes. Critical evaluation of the use and misuse of scientific discoveries in these areas.

~~Effective Summer 2002~~ Effective Fall 2009

ISP 203A Understanding Earth: Global Change
Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test
Science as a way of knowing about natural and anthropogenic global change. Implications for societies.
~~Effective Fall 2005~~ Effective Fall 2009

ISP 203B Understanding Earth: Natural Hazards and the Environment
Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test
Science as a way of knowing about natural hazards, as well as natural and anthropogenic environmental change. Implications for societies.
~~Effective Fall 2005~~ Effective Fall 2009

ISP 205 Visions of the Universe
Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test
Role of observation, theory, philosophy, and technology in the development of the modern conception of the universe. The Copernican Revolution. Birth and death of stars. Spaceship Earth. Cosmology and time.
~~Effective Summer 2002~~ Effective Fall 2009

ISP 207 World of Chemistry
Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test
The language, concepts, models and techniques of chemical science, including atomic theory; nuclear energy; acids; chemicals in air, water, food and biological systems.
~~Effective Summer 2002~~ Effective Fall 2009

ISP 209 The Mystery of the Physical World
Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or STT 201) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or STT 201) or designated score on Mathematics Placement test
Laws of physics through demonstrations and analyses of every day phenomena. Optics, mechanical systems and electromagnetic phenomena.
~~Effective Summer 2002~~ Effective Fall 2009

ISP 213H Navigating the Universe

Spring of every year. 3(3-0) Interdepartmental with Physics. ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test RB: High school physics, high school algebra, and high school trigonometry

Philosophical and biographical history of physics. Comparing physics of fields, relativity, quantum mechanics, elementary particle physics, and cosmology to art as an alternate way of understanding and representing the world.

~~Effective Fall 2005~~ Effective Fall 2009

ISP 215 The Science of Sound

Fall of every year. Spring of every year. 3(3-0) ~~P: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or STT 201) or designated score on Mathematics Placement test~~ P: (MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or STT 201) or designated score on Mathematics Placement test

The science of speech, communication, musical instruments, room acoustics, and analogue and digital audio. Integrating the physical, physiological, and psychological principles involved.

~~Effective Summer 2002~~ Effective Fall 2009

ISP 217 Water and the Environment

Fall of every year. Spring of every year. 3(3-0) ~~P: MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)~~ P: MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 106 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)

Application of the scientific method to identification and solution of environmental problems related to water.

~~Effective Spring 2005~~ Effective Fall 2009

ISP 221 Earth Environment and Energy

Fall of every year. Spring of every year. Summer of every year. 3(3-0) ~~P: MTH 103 or MTH 110 or MTH 116 or LBS 117 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)~~ P: MTH 103 or MTH 110 or MTH 116 or LB 118 or (MTH 112 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)

Flow of energy into, through, and out of the earth's lithosphere, hydrosphere, atmosphere, and biosphere. Energy, entropy, and life processes. Global warming, greenhouse effect, and contemporary issues.

~~Effective Fall 2005~~ Effective Fall 2009

~~ZOL 404~~
MMG 404 Human Genetics

Spring of every year. 3(3-0) P: (ZOL 341) and (BMB 401 or concurrently or BMB 461 or concurrently) and completion of Tier I writing requirement.

Inheritance of human traits. Medical, molecular, physiological and forensic applications. Biochemical, clinical, and molecular genetics of human disease. Prenatal, pre-symptomatic, and clinical diagnosis. Ethical, legal and social considerations.
SA: ZOL 344

~~Effective Fall 2003~~ Effective Summer 2010

MMG 631 Veterinary Medical Genetics
Spring of every year. 1(1-0) RB: Completion of year 1 of the graduate-professional program in the College of Veterinary Medicine. R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW Mechanisms, recognition, diagnosis, and control of genetics diseases in veterinary medicine.
Effective Fall 2010

PHY 184 Physics for Scientists and Engineers II
Fall of every year. Spring of every year. 4(5-0) P: {PHY 183 or PHY 183B or PHY 193H or PHY 233B or LB 271} and (MTH 133 or MTH 153H or LB 119) RB: MTH 133 or MTH 153H or LB 119 ~~Not open to students with credit in LB 272 or PHY 184B or PHY 232 or PHY 233B or PHY 294H or PHY 232C.~~ Not open to students with credit in LB 272 or PHY 184B or PHY 232 or PHY 234B or PHY 294H or PHY 232C.

Electricity and magnetism, electromagnetic waves, light and optics, interference and diffraction.
~~Effective Summer 2009~~ Effective Summer 2010

PLB 400 Introduction to Bioinformatics
Spring of every year. 3(2-2) Interdepartmental with Biochemistry and Molecular Biology and Microbiology and Molecular Genetics. P: (STT 200 or STT 201 or STT 231 or STT 421) and (PLB 203 or MMG 201 or BMB 200) ~~RB: An introductory biology course covering basic genetics, macromolecules, evolution, energy metabolism, genetic materials, and signal transduction is recommended for non-biology majors. A statistic course covering random variable, distributions, and ba~~ RB: An introductory biology course covering basic genetics, macromolecules, evolution, energy metabolism, genetic materials, and signal transduction is recommended for non-biology majors. A statistic course covering random variable, distributions, and basic probability theory is recommended for biology majors. ~~Not open to students with credit in MMG 433.~~

Bioinformatic theory and practice. How to manage and analyze sequences, structures, gene expression, and other types of biological data.
~~Effective Spring 2008~~ Effective Summer 2010

PLB 810 Theories and Practices in Bioinformatics
Spring of every year. 3(2-2) Interdepartmental with Biochemistry and Molecular Biology and Microbiology and Molecular Genetics. RB: Basic genetics, macromolecules, evolution, energy metabolism, genetic materials, and signal transduction is recommended for non-biology majors. A statistic course covering random variable, distributions, and basic probability theory is recommended for biology majors. ~~Not open to students with credit in MMG 433.~~

Introduction of the theories and algorithms behind widely used bioinformatics tools. Basic tool development by writing scripts in the Python programming language for data analysis.
Effective Summer 2010

COLLEGE OF VETERINARY MEDICINE

LCS 632 Advanced Food Animal Medicine and Surgery Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. ~~P: (LCS 630 or concurrently)~~ P: (LCS 630 or concurrently) and LCS 682 RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Principles of diagnostic treatment and prevention of diseases in food and fiber animals.
Self-directed and in-depth on-farm and in-clinic experience.
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 2006~~ Effective Spring 2010

PDI 634 Endocrinology Clerkship
Spring of every year. 3 credits. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine. R: Open to graduate-professional students in the College of Veterinary Medicine.
Principles of endocrinology and diagnosis of endocrinology disorders. Case review and interpretation.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
SA: PTH 634
~~Effective Fall 2006~~ Effective Summer 2010

PHM 810 Synaptic Transmission
Spring of odd years. 3(3-0) ~~R: Approval of department.~~ R: Open to graduate students or master's students or doctoral students or lifelong graduate students or approval of department.
Chemical and electrical aspects of nerve impulse transmission at synaptic and neuroeffector junctions. Influence of drugs.
~~Effective Spring 1993~~ Effective Fall 2009

PHM 813 Cardiovascular Pharmacology
Spring of even years. 3(3-0) ~~R: Approval of department.~~ R: Open to graduate students or master's students or doctoral students.
Cardiovascular signal transduction and control in normal and pathophysiologic states.
~~Effective Fall 1997~~ Effective Fall 2009

PHM 820 Cellular, Molecular and Integrated Systems Pharmacology and Toxicology
Fall of every year. 4(4-0) P: BMB 801 and BMB 802 and PHM 827 and PSL 828 R: Approval of department.
Comprehensive overview of the cellular and molecular mechanisms of drug and chemical actions on the major organ systems of humans and other mammals.
~~Effective Fall 2007~~ Effective Fall 2009

PHM 830 Experimental Design and Data Analysis
Fall of every year. Summer of every year. 3(3-0) RB: Undergraduate degree in biology, chemistry or related field. ~~R: Not open to undergraduate students.~~ R: Open to graduate students or lifelong graduate students. ~~Not open to students with credit in PHM 980.~~
Practical application of statistical principles to the design of experiments and analysis of experimental data in pharmacology, toxicology, and related biomedical sciences.
~~Effective Fall 2007~~ Effective Summer 2010

PHM 831 Endocrine Pharmacology
Fall of every year. 2(2-0) ~~P: PHM 819~~ R: Open to graduate students or lifelong graduate students. Not open to students with credit in PHM 820.
Physiology, pharmacology, and toxicology of the endocrine system. Endocrine diseases, pharmacological intervention, hormone therapy, endocrine disruptors, role of hormones in normal metabolism and metabolic disorders, and animal models of endocrine and metabolic disorders.
~~Effective Fall 2007~~ Effective Fall 2009

PHM 833 Gastro-Intestinal and Liver Pharmacology
Spring of every year. 2(2-0) ~~P: PHM 819~~ RB: Some pharmacology background is recommended: for example - PHM 350 or PHM 819 R: Open to graduate students or lifelong graduate students.
Specific drugs and their mechanisms of action in the treatment of gastrointestinal and liver diseases. Toxic effects of drugs and other xenobiotics on the gastrointestinal tract, including the liver.
~~Effective Spring 2008~~ Effective Spring 2010

PHM 834 Respiratory Pharmacology
Spring of every year. 2(2-0) ~~P: PHM 819~~ ~~RB: Some prior coursework in physiology useful.~~ RB: Some prior coursework in physiology or pharmacology useful. R: Open to graduate students or lifelong graduate students.
Integrative study of drugs, their mechanism of action, and their side effects in the treatment of major diseases and pathologies of the respiratory system.
~~Effective Spring 2008~~ Effective Spring 2010

PHM 840 Safety Pharmacology
Spring of every year. 2(2-0) ~~P: PHM 350 or PHM 819~~ RB: Undergraduate degree in biology, chemistry or related area. Prior coursework in physiology useful. ~~R: Open to seniors or graduate students or lifelong graduate students.~~ R: Open to graduate students or lifelong graduate students.
Systems study of current experimental models, risk assessment, and regulatory guidelines for evaluating drug candidates for pharmacologic effects unrelated to therapeutic effects.
~~Effective Spring 2009~~ Effective Spring 2010

PHM 850 Communications for Biomedical Researchers
Summer of every year. 2(2-0) R: Open to graduate students or lifelong graduate students.
Effective research and business communication, including written and verbal skills for a variety of audiences and purposes.
~~Effective Summer 2008~~ Effective Fall 2009

PHM 851 Intellectual Property and Patent Law for Biomedical Sciences
Fall of every year. 2(2-0) RB: Strong reading and writing skills helpful. ~~R: Not open to Law students.~~ R: Open to graduate students or lifelong graduate students.
Fundamentals of intellectual property and patent law encountered by biomedical scientists, including issues of prevention, patent prosecution, and enforcement of patents in a litigation setting.
~~Effective Fall 2008~~ Effective Fall 2010

PHM 854 Leadership and Team-Building for Biomedical Research
~~Fall of every year.~~ Spring of every year. 2(2-0) RB: Experience supervising others and/or participation in workplace teams is strongly suggested. R: Open to graduate students or lifelong graduate students. Not open to students with credit in CMBA 804 or CMBA 805 or CMBA 806 or CMBA 832.
Evaluation of current leadership methods. Models of leadership. Practice of specific skills and development of a plan to increase their influence and extend learning beyond the class.
~~Effective Fall 2007~~ Effective Summer 2010

PHM 855 The Business of Biomedical Research Organizations
Spring of every year. 2(2-0) R: Open to graduate students or lifelong graduate students.
Theories, methods, terminology, and culture of business as used in biomedical research and development environments.
~~Effective Spring 2008~~ Effective Spring 2010

PHM 857 Project Management
~~Spring of every year.~~ Summer of every year. 2(2-0) ~~R: Open to graduate students in the Biomedical Laboratory Diagnostics Program or in the Department of Pharmacology and Toxicology or approval of department.~~ R: Open to graduate students or lifelong graduate students. ~~Not open to students with credit in PHM 858.~~
Formal project management culture, principles, knowledge areas, and terminology. Specific tools and techniques including work breakdown structure, earned value analysis, risk management, and quality control for managing scientific research. Offered first ten weeks of semester.
~~Effective Spring 2008~~ Effective Summer 2010

PHM 858 ~~Project Management and the Drug Development Process~~
Drug Development Process
Fall of every year. 3(3-0) ~~RB: Some experience working on laboratory or clinical research projects is useful.~~ RB: Some experience working with laboratory or clinical research projects is useful. This course may also be useful for individuals in the pharmaceutical industry and government. R: Open to graduate students or lifelong graduate students.
Project management standards and best practices in drug development process, including clinical trials.
~~Effective Fall 2007~~ Effective Fall 2009

PHM 980 Problems

Fall of every year. Spring of every year. Summer of every year. 2 to 5 credits. A student may earn a maximum of 20 credits in all enrollments for this course. ~~R: Open only to graduate students. Approval of department.~~ R: Open to doctoral students. Approval of department.

Limited work in selected research projects.

~~Effective Fall 1992~~ Effective Fall 2009

SCS 562 Veterinary Medical Genetics

Spring of every year. 1(1-0) RB: Completion of year 1 of the graduate-professional program in the College of Veterinary Medicine. R: Open to graduate-professional students in the College of Veterinary Medicine.

Mechanisms, recognition, diagnosis, and control of genetics diseases in veterinary medicine.

DELETE COURSE

Effective Summer 2010

SCS 565 Animal Behavior

Fall of every year. Spring of every year. 1(1-0) RB: Completion of year 1 of the graduate-professional program in the College of Veterinary Medicine. R: Open to graduate-professional students in the College of Veterinary Medicine.

Diagnosis, treatment and prevention of behavioral problems in dogs and cats. Topics include problem prevention, behavioral intervention, aggression, anxiety related problems, inappropriate elimination, normal unwanted behavior, client counseling and interaction, and companion animal welfare.

~~Effective Spring 2009~~ Effective Spring 2010