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.

   The concentrations in the Bachelor of Science degree in Food Science are 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 Food Science make the following changes:

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

              FSC 422  Advanced Professional Seminar in Food Science 1

      Add the following course:

              FSC 322  Advanced Professional Seminar in Food Science 1

   Effective Fall 2020.

COLLEGE OF ENGINEERING

1. Request to change the Admission to the College statement in the College of Engineering. The University Committee on Undergraduate Education (UCUE) will consider this request.

   a. Under the heading Admission to the College make the following changes:

      (1) Replace item 4. with the following:

              Completion of Chemistry 141 or 151 or approved substitution or waiver. Computational Data Science and Computer Science majors are not required to fulfill this requirement.

   Effective Spring 2020.

2. Request to change the Graduation Requirements for All Majors in the College of Engineering. The University Committee on Undergraduate Education (UCUE) will consider this request.

   a. Under the heading Graduation Requirements for All Majors make the following changes:

      (1) Change item 1., paragraph one to the following:

              The University requirements for bachelor's degrees as described in the Undergraduate Education section of the catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Computer Science, the Bachelor of Science degree in Computer Science Data Science, and the Bachelor of Science degree in Applied Engineering Sciences; and 128 credits, including general elective credits, are required for the Bachelor of Science degree in the other Engineering majors.

      (2) Change item 2. b., to the following:

              Chemistry 141 or 151. Computational Data Science and Computer Science majors are not required to complete Chemistry 141 or 151.
(3) Change item 2.e. to the following:

One technical computing course depending on intended major: CMSE 202 (Computational Data Science), CSE 220 (Electrical Engineering), CSE 231 (Computer Science, Computer Engineering, Mechanical Engineering), or EGR 102 (all other engineering majors).

Effective Spring 2020.

3. Request to change the name of the Linked Bachelor of Science Degree in Computer Engineering and Master of Science Degree in Electrical Engineering in the Department of Electrical and Computer Engineering to Linked Bachelor of Science Degree in Computer Engineering and Master of Science Degree in Electrical and Computer Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its September 9, 2019 meeting.

Students admitted to the major prior to Summer 2019 will be awarded a Master of Science Degree in Electrical Engineering.

Students admitted to the major Summer 2019 and forward will be awarded a Master of Science Degree in Electrical and Computer Engineering.

Per University policy:

A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

Effective Summer 2019.

4. Request to change the name of the Linked Bachelor of Science Degree in Electrical Engineering and Master of Science Degree in Electrical Engineering in the Department of Electrical and Computer Engineering to Linked Bachelor of Science Degree in Electrical Engineering and Master of Science Degree in Electrical and Computer Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its September 9, 2019 meeting.

Students admitted to the major prior to Summer 2019 will be awarded a Master of Science Degree in Electrical Engineering.

Students admitted to the major Summer 2019 and forward will be awarded a Master of Science Degree in Electrical and Computer Engineering.

Per University policy:

A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

Effective Summer 2019.
COLLEGE OF NATURAL SCIENCE

1. Request to change the requirements for the Bachelor of Science degree in Human Biology in the College of Natural Science.

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

      (1) In item 3. b. change the total credits from ‘14’ to ‘15’ and the credits of ‘NSC 495’ from ‘2’ to ‘3’.

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

          BLD 416 Clinical Chemistry     4
          KIN 310 Physiology Bases of Physical Activity   3
          KIN 330 Biomechanics of Physical Activity    3
          MMG 463 Medical Microbiology     3

          Add the following courses:

          BLD  439  Histocompatibility and Immunogenetics    1
          BLD  446  Immunobiology of Neoplasia             1
          BLD  447  Immunomodulation and Immunotherapy     1
          HNF 310 Nutrition in Medicine for Pre-Health Professionals  3
          IBIO 445  Evolution (W)      3
          MMG 365  Medical Microbiology   3
          MMG 365L Medical Microbiology Laboratory       1
          MMG 465  Advanced Medical Microbiology           3
          MMG 465L Advanced Medical Microbiology Laboratory    1
          NEU 310  Psychology and Biology of Human Sexuality 3
          PHM 321  Common Drugs     3
          PHM 430  Human Pharmacology 3
          PHM 440  Principles of Drug Action     1
          PHM 461  Tropical Medicine Pharmacology        2
          PSL 311L  Physiology Laboratory for Pre-Health Professionals  2

   Effective Spring 2020.

2. Request to change the requirements for the Master of Science degree in Mathematics Education in the College of Natural Science. The University Committee on Graduate Studies (UCGS) will consider this request at its September 9, 2019 meeting.

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

      The program admits students with a variety of backgrounds. Some students will have equally strong backgrounds in education and mathematics. Others may have more extensive prior preparation in one of these two disciplines.

      Admissions decisions will be made by an Admissions Committee composed of members of the Mathematics Education Faculty Group.

   b. Under the heading Requirements for the Master of Science Degree in Mathematics Education replace the entire entry with the following:

      The students must complete 30 credits for the degree. The program is available only under Plan B (without thesis). The student's program of study must be approved by the student's academic advisor and must include:

      CREDITS

      1. All of the following courses (12 credits):

         MTHE 926  Proseminar in Mathematics Education I       3
         MTHE 927  Proseminar in Mathematics Education II      3
2. Complete a minimum of 18 credits of course work relevant to the student’s focus within mathematics education.
3. Complete a final evaluation.

Effective Spring 2020.

3. Request to change the requirements for the Doctor of Philosophy degree in Mathematics Education in the College of Natural Science. The University Committee on Graduate Studies (UCGS) will consider this request at its September 9, 2019 meeting.

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

The program admits students with a variety of backgrounds. Some students will have equally strong backgrounds in education and mathematics. Others may have more extensive prior preparation in one of these two disciplines.

Admissions decisions will be made by an Admissions Committee composed of members of the Mathematics Education Faculty Group. A student who shows promise for success at doctoral study but who needs additional background to be eligible for admission to the Ph.D. program will be provided with specific conditions to be met before admission. Upon successful completion of these requirements, the student may reapply.

b. Under the heading Requirements for the Doctor of Philosophy Degree in Mathematics Education replace the entire entry with the following:

The students must complete the requirements listed below. The student’s program of study must be approved by the student’s guidance committee and must include:

<table>
<thead>
<tr>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHE 926 Proseminar in Mathematics Education I</td>
</tr>
<tr>
<td>MTHE 927 Proseminar in Mathematics Education II</td>
</tr>
<tr>
<td>MTHE 954 Design and Methods in Mathematics Education Research</td>
</tr>
<tr>
<td>TE 950 Mathematical Ways of Knowing</td>
</tr>
</tbody>
</table>
| **Research Methods** (9 credits):
  a. One course in quantitative research methods | 3 |
  b. One course in qualitative research methods | 3 |
  c. One additional research methods course | 3 |

Research methods courses must be approved by the student's guidance committee.

3. **Research Practicum** (3 credits):

MTHE 995 Research Practicum | 3 |

4. **Mathematics and Mathematical Knowledge for Teaching** (12 credits):

Complete 12 credits of course work, approved by the student’s guidance committee, focusing on mathematics content, both traditional mathematical sciences content and specialized knowledge needed by those engaging in research on teaching and learning mathematics.

5. **Area of Concentration** (12 credits):

Complete 12 credits of course work in an area of concentration as approved by the student’s guidance committee.

6. Successful completion of comprehensive examinations administered by program faculty.

7. **Doctoral Dissertation**

Complete at least 24 credits and no more than 36 credits of MTHE 999 Doctoral Dissertation Research and successfully defend the oral dissertation.

Effective Spring 2020.
COLLEGE OF VETERINARY MEDICINE

1. Request to change the name of the Bachelor of Science degree in Veterinary Technology to Veterinary Nursing in the College of Veterinary Medicine.

Students admitted to the major prior to Spring 2020 will be awarded a Bachelor of Science Degree in Veterinary Technology.

Students admitted to the major Spring 2020 and forward will be awarded a Bachelor of Science Degree in Veterinary Nursing.

Effective Spring 2020.

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

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

(1) In item 2. change the total credits from ‘103’ to ‘102’.

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

(a) Change the total credits from ‘73’ to ‘72’.

(b) Delete the following courses:

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 130</td>
<td>Comparative Anatomy for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 140</td>
<td>Pharmacology for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 155</td>
<td>Veterinary Technology Careers and Professional Development</td>
<td>1</td>
</tr>
<tr>
<td>VM 170</td>
<td>Hematology and Immunology for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 175</td>
<td>Clinical Pathology Laboratory I for Veterinary Technicians</td>
<td>1</td>
</tr>
<tr>
<td>VM 176</td>
<td>Clinical Pathology Laboratory II for Veterinary Technicians</td>
<td>1</td>
</tr>
<tr>
<td>VM 205</td>
<td>Preventive Animal Health Care for Veterinary Technicians</td>
<td>3</td>
</tr>
<tr>
<td>VM 210</td>
<td>Surgical Nursing for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 245</td>
<td>Parasitology for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 250</td>
<td>Veterinary Comparative Clinical Physiology</td>
<td>5</td>
</tr>
<tr>
<td>VM 265</td>
<td>Dentistry Techniques for Veterinary Technicians</td>
<td>1</td>
</tr>
<tr>
<td>VM 270</td>
<td>Advanced Skills Development for Veterinary Technicians</td>
<td>1</td>
</tr>
<tr>
<td>VM 295</td>
<td>Biomedical Research and Regulatory Issues for Veterinary Technicians</td>
<td>1</td>
</tr>
<tr>
<td>VM 303</td>
<td>Anesthesiology for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 304</td>
<td>Radiology for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 305</td>
<td>Hospital Practice Management for Veterinary Technicians</td>
<td>2</td>
</tr>
<tr>
<td>VM 410</td>
<td>Veterinary Technology Clerkship in Anesthesiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 411</td>
<td>Veterinary Technology Clerkship in Radiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 412</td>
<td>Veterinary Technology Clerkship in Companion Animal Medicine</td>
<td>3</td>
</tr>
<tr>
<td>VM 413</td>
<td>Veterinary Technology Clerkship in Companion Animal Surgery</td>
<td>3</td>
</tr>
</tbody>
</table>
Add the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 130</td>
<td>Comparative Anatomy for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 140</td>
<td>Pharmacology for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 155</td>
<td>Veterinary Nursing Careers and Professional Development</td>
<td>1</td>
</tr>
<tr>
<td>VM 170</td>
<td>Hematology and Immunology for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 175</td>
<td>Clinical Pathology Laboratory I for Veterinary Nurses</td>
<td>1</td>
</tr>
<tr>
<td>VM 176</td>
<td>Clinical Pathology Laboratory II for Veterinary Nurses</td>
<td>1</td>
</tr>
<tr>
<td>VM 205</td>
<td>Preventive Animal Health Care for Veterinary Nurses</td>
<td>3</td>
</tr>
<tr>
<td>VM 210</td>
<td>Surgical Nursing for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 245</td>
<td>Parasitology for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 250</td>
<td>Veterinary Comparative Clinical Physiology</td>
<td>4</td>
</tr>
<tr>
<td>VM 265</td>
<td>Dentistry Techniques for Veterinary Nurses</td>
<td>1</td>
</tr>
<tr>
<td>VM 270</td>
<td>Advanced Skills Development for Veterinary Nurses</td>
<td>1</td>
</tr>
<tr>
<td>VM 295</td>
<td>Biomedical Research and Regulatory Issues</td>
<td>1</td>
</tr>
<tr>
<td>VM 303</td>
<td>Anesthesiology for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 304</td>
<td>Radiology for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 305</td>
<td>Hospital Practice Management for Veterinary Nurses</td>
<td>2</td>
</tr>
<tr>
<td>VM 410</td>
<td>Veterinary Nursing Clerkship in Anesthesiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 411</td>
<td>Veterinary Nursing Clerkship in Radiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 412</td>
<td>Veterinary Nursing Clerkship in Companion Animal Medicine</td>
<td>3</td>
</tr>
<tr>
<td>VM 413</td>
<td>Veterinary Nursing Clerkship in Companion Animal Surgery</td>
<td>3</td>
</tr>
<tr>
<td>VM 414</td>
<td>Veterinary Nursing Clerkship in Equine Medicine and Surgery</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 415</td>
<td>Veterinary Nursing Clerkship in Food Animal and Equine Medicine and Surgery</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 450</td>
<td>Veterinary Nursing Clerkship in Emergency Medicine</td>
<td>3</td>
</tr>
<tr>
<td>VM 451</td>
<td>Veterinary Nursing Clerkship in Cardiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 452</td>
<td>Veterinary Nursing Clerkship in Neurology</td>
<td>3</td>
</tr>
<tr>
<td>VM 453</td>
<td>Veterinary Nursing Clerkship in Ophthalmology</td>
<td>3</td>
</tr>
<tr>
<td>VM 454</td>
<td>Veterinary Nursing Clerkship in Critical Care</td>
<td>3</td>
</tr>
<tr>
<td>VM 466</td>
<td>Veterinary Nursing Clerkship in Large Animal Anesthesia</td>
<td>3</td>
</tr>
<tr>
<td>VM 470</td>
<td>Veterinary Nursing Clerkship in Food Animal Medicine</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 480</td>
<td>Veterinary Nursing Clerkship in Clinical Pathology</td>
<td>3</td>
</tr>
<tr>
<td>VM 482</td>
<td>Veterinary Nursing Clerkship in Necropsy</td>
<td>3</td>
</tr>
</tbody>
</table>

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

(a) Change the credits of ‘ANS 413’ from ‘3’ to ‘4’.

(b) Delete the following course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 285</td>
<td>Clinical Nutrition for Veterinary Technologists</td>
<td>1</td>
</tr>
</tbody>
</table>

Add the following course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 285</td>
<td>Clinical Nutrition for Veterinary Nurses</td>
<td>1</td>
</tr>
</tbody>
</table>

(4) Replace item 2. d. with the following:

At least 18 credits from the following courses or from the courses listed in item 2. c. All course selections must be approved by the student’s academic advisor:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 414</td>
<td>Veterinary Nursing Clerkship in Equine Medicine and Surgery</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 415</td>
<td>Veterinary Nursing Clerkship in Food Animal and Equine Medicine and Surgery</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 450</td>
<td>Veterinary Nursing Clerkship in Emergency Medicine</td>
<td>3</td>
</tr>
<tr>
<td>VM 451</td>
<td>Veterinary Nursing Clerkship in Cardiology</td>
<td>3</td>
</tr>
<tr>
<td>VM 452</td>
<td>Veterinary Nursing Clerkship in Neurology</td>
<td>3</td>
</tr>
<tr>
<td>VM 453</td>
<td>Veterinary Nursing Clerkship in Ophthalmology</td>
<td>3</td>
</tr>
<tr>
<td>VM 454</td>
<td>Veterinary Nursing Clerkship in Critical Care</td>
<td>3</td>
</tr>
<tr>
<td>VM 466</td>
<td>Veterinary Nursing Clerkship in Large Animal Anesthesia</td>
<td>3</td>
</tr>
<tr>
<td>VM 470</td>
<td>Veterinary Nursing Clerkship in Food Animal Medicine</td>
<td>3 to 6</td>
</tr>
<tr>
<td>VM 480</td>
<td>Veterinary Nursing Clerkship in Clinical Pathology</td>
<td>3</td>
</tr>
<tr>
<td>VM 482</td>
<td>Veterinary Nursing Clerkship in Necropsy</td>
<td>3</td>
</tr>
</tbody>
</table>
VM 483  Veterinary Nursing Clerkship in Biomedical Research 3 to 12
VM 484  Veterinary Nursing Clerkship in Zoo and Wildlife 3 to 12
VM 486  Veterinary Nursing Clerkship in Clinical Parasitology 3
VM 490  Veterinary Nursing Clerkship in Special Problems 3 to 12

Effective Spring 2020.

2. Request to change the requirements for the Minor in Pharmacology and Toxicology in the Department of Pharmacology and Toxicology.

   a. Under the heading Requirements for the Minor in Pharmacology and Toxicology make the following change:

      (1) In item 4., delete the following course:
          CEM 419  Independent Study 2
          ZOL 450  Cancer Biology (W) 3

      Add the following courses:

          IBIO 450  Cancer Biology (W) 3
          PHM 461  Tropical Medicine Pharmacology 2
          PHM 483  Chemotherapy of Infectious Diseases 3

      Replace the note with the following:

          Students should consult their academic advisor for section specific information for enrollment in PHM 480.

Effective Spring 2020.
PART II - NEW COURSES AND CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

FSC 222 Professional Development and Career Planning in Food Science
Fall of every year. 1(1-0) P: FSC 211 or concurrently RB: Introductory course in food science R: Open to students in the Food Science Major.
Career opportunities in food science; training in oral, written, and visual communication skills for professional development.
Effective Fall 2018 Effective Fall 2020

FSC 322 Advanced Professional Seminar in Food Science
Spring of every year. 1(1-0) P: FSC 222 R: Open to sophomores or juniors in the Food Science Major.
NEW Preparation for success in food science careers, marketing tools, business communication skills, and contemporary topics in food science.
SA: FSC 422
Effective Fall 2020

CSS 431 International Agricultural Systems
Spring of every year. 3(3-0) P: (ANR 250 or EEP 260 or ISS 310 or ISS 315 or ISS 318 or ISS 320 or ISS 330A or ISS 330B or ISS 330C or ISS 336) and completion of Tier I writing requirement P: (ANR 250 or ISS 310 or ISS 315 or ISS 318 or ISS 320 or ISS 330A or ISS 330B or ISS 330C or ISS 336) and completion of Tier I writing requirement R: Not open to freshmen.
World production capacity for food, fiber and biofuel as related to soil, biology and climatic resources. Principles and case studies of sustainable systems presented from developing and developed countries. Emerging issues in agricultural globalization and biodiversity.
Effective Spring 2014 Effective Fall 2018

CSS 846 Integrated Climate and Cropping System Modeling
Spring of odd years. 3(3-0) Interdepartmental with Biosystems Engineering. RB: GEO 402
NEW Crop simulation modeling for water and nutrient use under resource limitations and varying climatic conditions to inform decision making.
Effective Spring 2019

COLLEGE OF ENGINEERING

BE 482 Engineering Ecological Treatment Systems
Fall of every year. Spring of every year. 3(2-2) P: (BE 350 or ENE 483 or CHE 312) and (BE 360 or ENE 487 or CHE 431) R: Open to juniors or seniors in the College of Engineering.
Analysis of pollutants in ecological systems. Engineering design of ecological systems to prevent, mitigate, and treat diffuse and point source pollution, including low impact development (LID) strategies and best management practices (BMPs).
Effective Fall 2018 Effective Fall 2019

CMSE 801 Introduction to Computational Modeling
Introduction to Computational Modeling and Data Analysis
Fall of every year. Spring of every year. 3(3-0) RB: One semester of introductory calculus
Introduction to computational modeling using a wide variety of application examples. Algorithmic thinking and model building, data visualization, numerical methods, all implemented as programs. Command line interfaces. Scientific software development techniques including modular programming, testing, and version control.
SA: NSC 801
Effective Summer 2017 Effective Fall 2019
CMSE 802  Methods in Computational Modeling
Fall of every year. Spring of every year. 3(3-0) RB: (CMSE 801) or equivalent experience
Standard computational modeling methods and tools. Programming and code-management techniques.
SA: NSC 802

Effective Summer 2017  Effective Fall 2019

COLLEGE OF HUMAN MEDICINE

FM 641  Family Medicine Subinternship in the Late Clinical Experience
Family Medicine Clerkship in the Late Clinical Experience
Fall of every year. Spring of every year. Summer of every year. 6 credits. P: HM 556 R: Open to graduate-professional students in the College of Human Medicine.
Clinical experience in which students take primary responsibility for managing the care of patients in a primary care setting under the supervision of attending physicians.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2017  Effective Summer 2019

HM 616  Radiation Oncology Clerkship
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course. P: HM 556 or approval of college R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.
NEW Diagnosis, staging, and treatment of cancers amenable to radiation therapy modalities.
Indications for and complications of radiation therapy in definitive and palliative settings.
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 Summer 2019

HM 655  Advanced Skills and Knowledge in Medical School V
Fall of every year. Spring of every year. 2(2-0) A student may earn a maximum of 6 credits in all enrollments for this course. P: HM 654 P: HM 654 or concurrently R: Open to graduate-professional students in the College of Human Medicine.
Interdisciplinary small group course for advanced medical students combining advanced clinical skills with deep exploration of scientific and humanities literature underlying these skills.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Spring 2019  Effective Fall 2019

MED 641  Internal Medicine Subinternship in the Late Clinical Experience
Internal Medicine Clerkship in the Late Clinical Experience
Fall of every year. Spring of every year. Summer of every year. 6 credits. P: HM 556 R: Open to graduate-professional students in the College of Human Medicine.
Clinical experience in which students take primary responsibility for managing the care of adult patients under the supervision of senior residents and/or attending physicians.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2017  Effective Summer 2019
PHD 641  Pediatric Subinternship in the Late Clinical Experience
Pediatric Clerkship in the Late Clinical Experience
Fall of every year. Spring of every year. Summer of every year. 6 credits. P: HM 556 R: Open to graduate-professional students in the College of Human Medicine.
Clinical experience in which students take primary responsibility for managing the care of pediatric patients under the supervision of senior residents and/or attending physicians.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2017 Effective Summer 2019

COLLEGE OF NATURAL SCIENCE

BMB 471  Advanced Biochemistry Laboratory
Spring of every year. 3(0-6) P: BMB 461 and CEM 262 P: (BMB 461) and CEM 262 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 Summer 2014 Effective Fall 2019

BMB 472  Advanced Molecular Biology Laboratory
Fall of every year. 3(0-6) P: CEM 262 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
Effective Summer 2014 Effective Fall 2019

CEM 121  Explorations in Chemistry
Fall of every year. Spring of every year. 3(4-0) P: MTH 103 or concurrently P: (MTH 103 or concurrently) or (MTH 103A or concurrently) or (MTH 103B or concurrently) R: Approval of department. Not open to students with credit in CEM 141 or CEM 151 or CEM 181H or LB 171.
Introduction to core ideas in chemistry (structure and properties of matter, energy, and electrical forces) blended with science practices (use of models, argumentation, construction of scientific explanations, mathematical thinking) to understand and explain chemical phenomena.
Effective Fall 2015 Effective Summer 2020

CEM 251  Organic Chemistry I
Fall of every year. Spring of every year. Summer of every year. 3(4-0) P: CEM 141 or CEM 151 or CEM 181H or LB 171 RB: CEM 142 or CEM 152 or CEM 182H or LB 172 Not open to students with credit in CEM 351.
Common classes of organic compounds including their nomenclature, structure, bonding, reactivity, and spectroscopic characterization.
Effective Fall 2013 Effective Summer 2020

CEM 311  Inorganic Chemistry
Fall of every year. Spring of every year. 3(3-0) P: CEM 142 or CEM 152 or CEM 182H or LB 172 RB: CEM 384
Basic symmetry, molecular orbital theory, and valence bond theory applications to inorganic systems. Physical properties and reactivity of transition metal systems.
Effective Spring 2013 Effective Spring 2020
CEM 333  Instrumental Methods and Applications
Spring of every year. 3(2-3) P: (CEM 262 or (CEM 162 and BLD 213 and BLD 417)) and ((CEM 143 or CEM 251 or CEM 351) and completion of Tier I writing requirement) P: (CEM 262) or (CEM 162 and BLD 213L and BLD 313)) and ((CEM 143 or CEM 251 or CEM 351) and completion of Tier I writing requirement)
Principles and applications of instrumental analysis of separation techniques. Effective Spring 2015 Effective Fall 2018

IBIO 303  Oceanography
Fall of every year. 4(4-0) Interdepartmental with Geological Sciences, Interdepartmental with Integrative Biology. P: (CEM 141 or CEM 181H or LB 171 or CEM 151) and (PHY 231 or PHY 183 or PHY 193H or LB 273 or PHY 183B or PHY 231C or PHY 241)
Physical, chemical, biological, and geological aspects of oceanography: ocean circulation, waves, tides, air-sea interactions, chemical properties of ocean water, ocean productivity, shoreline processes, and sediments. SA: ZOL 303 SA: IBIO 303 Effective Spring 2018 Effective Summer 2020

GLG 873  Introduction to Numerical Tools for Earth and Environmental Scientists
Fall of odd years. Spring of even years. 3(3-0) RB: B.S. in the Earth Sciences or related field
Introduction to Linux and C including numerical methods, integration, curve-fitting, and differential equations with an emphasis on applications to the geological sciences. Effective Fall 2017 Effective Fall 2019

IBIO 200  Animal Biodiversity
Fall of every year. Spring of every year. 2(2-0)
NEW Importance of animal biodiversity in the context of evolution, ecology, conservation, and resource use. Effective Fall 2019

IBIO 391  Emerging Scholars
Fall of every year. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department.
NEW Professional development topics aimed at preparing for participating in research and beyond, the scientific method, research methods, and communication in science. Effective Fall 2019

IBIO 485  Tropical Biology (W)
Fall of every year. 3(3-0) Interdepartmental with Plant Biology. P: (IBIO 355) and completion of Tier I writing requirement R: Open to juniors or seniors.
Tropical biota emphasizing evolutionary and ecological principles compared across tropical ecosystems. SA: ZOL 485 Effective Fall 2016 Effective Fall 2019

IBIO 830  Statistical Methods in Ecology and Evolution I
Fall of every year. 3(3-0) Interdepartmental with Entomology and Plant Biology. R: Open to graduate students in the Department of Entomology or in the Ecology, Evolutionary Biology and Behavior Specialization or in the Ecology, Evolutionary Biology and Behavior Major or approval of department.
IBIO 831  Statistical Methods in Ecology and Evolution II  
Spring of every year. 3(3-0) Interdepartmental with Entomology and Plant Biology. P: IBIO 830  
R: Open to graduate students in the Department of Entomology or in the Ecology, Evolutionary  
Biological and Behavior Specialization or in the Ecology, Evolutionary Biology and Behavior Major or  
approval of department.  
Advanced interpretation and modeling of biological data with modern methods for  
estimation and inference using the R computing language.  
Effective Spring 2018  Effective Spring 2019

ISB 200  History of Life  
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: ((MTH 101 or  
concurrently) or (MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 112 or  
concurrently) or (MTH 116 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 101 or concurrently) or (MTH 103 or concurrently) or (MTH 103B or concurrently) or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 Summer 2016  Effective Fall 2019

ISB 201  Insects, Globalization, and Sustainability  
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: ((MTH 101 or  
concurrently) or (MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 112 or  
concurrently) or (MTH 116 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 101 or concurrently) or (MTH 103 or concurrently) or (MTH 103B or concurrently) or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2016  Effective Fall 2019

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 101 or  
concurrently) or (MTH 103 or concurrently) or (MTH 103B or concurrently) or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test  
P: ((MTH 101 or concurrently) or (MTH 103 or concurrently) or (MTH 103B or concurrently) or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2016  Effective Fall 2019
ISB 204  Applications of Biomedical Sciences
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: ((MTH 101 or concurrently) or (MTH 103 or concurrently) or (MTH 110 or concurrently) or (MTH 112 or concurrently) or (MTH 116 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 101 or concurrently) or (MTH 103 or concurrently) or (MTH 103B or concurrently) or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 Fall 2016 Effective Fall 2019

ISP 203A  Understanding Earth: Global Change
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: (MTH 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2016 Effective Fall 2019

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 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2016 Effective Fall 2019

ISP 205  Visions of the Universe
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: (MTH 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 Fall 2016 Effective Fall 2019
PART II - NEW COURSES AND CHANGES – continued - 14
September 12, 2019

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 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) 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 Fall 2016  Effective Fall 2019

ISP 215  The Science of Sound
Fall of every year. Spring of every year. 3(3-0) P: (MTH 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) 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 Fall 2016  Effective Fall 2019

ISP 217  Water 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 (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)
P: MTH 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2014  Effective Fall 2019

ISP 220  Quarks, Spacetime, and the Big Bang
Spring of odd years. 3(3-0) P: (MTH 101 or MTH 103 or MTH 110 or (MTH 112 or concurrently) or (MTH 116 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 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 or concurrently) or (STT 200 or concurrently) or (STT 201 or concurrently)) or designated score on Mathematics Placement test
Elementary particle physics and the Big Bang for non-scientists. A survey of particles and forces in the early universe as it is recreated at high energy particle colliders in laboratories around the world.
Effective Spring 2017  Effective Fall 2019

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 (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)
P: MTH 101 or MTH 103 or MTH 103B or (MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 201 or concurrently) or (LB 118 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 2014  Effective Fall 2019
MTH 309  Linear Algebra I
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: ((MTH 133 or MTH 153H or LB 119) and completion of Tier I writing requirement) and (MTH 299 or approval of department) P: (MTH 133 or MTH 153H or LB 119) and completion of Tier I writing requirement Not open to students with credit in MTH 317H.
Matrices, systems of linear equations, vector spaces, linear transformations, inner products and orthogonal spaces, eigenvalues and eigenvectors, and applications to geometry. A writing course with emphasis on proofs. Effective Fall 2017 Effective Fall 2019

MTH 451  Numerical Analysis I
Fall of every year. 3(3-0) P: (CSE 131 or CSE 231) and (CSE 131 or CSE 231) and (MTH 235 or MTH 340 or MTH 347H) P: (CSE 231 or CMSE 201) and (MTH 235 or MTH 340 or MTH 347H) Numerical solution of linear and nonlinear algebraic equations and eigenvalue problems. Curve fitting. Interpolation theory. Numerical integration, differentiation, and solution of differential equations. Algorithms implementation with a programming language like Fortran, C/C++ or MATLAB. SA: MTH 351 Effective Fall 2015 Effective Fall 2017

MTH 468  Predictive Analytics
Spring of every year. 3(3-0) Interdepartmental with Statistics and Probability. P: CSE 131 or CSE 231 or MTH 235 or MTH 340 or MTH 309 or MTH 360 or STT 442 P: (CSE 231) and (MTH 235 or MTH 340) and MTH 360 and STT 442 Predictive analytics for insurance business and risk management with an emphasis on the use of machine learning tools. Effective Fall 2018 Effective Fall 2019

MTHE 995  Research Practicum
Spring of every year. 3 credits. 1 to 3 credits. RB: MTHE 954 R: Open to graduate students in the Mathematics Education Major. Approval of department. Supervised research practicum. Design, execution, analysis, presentation, critique, and revision of research projects. 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 Summer 2013 Effective Fall 2019

COLLEGE OF OSTEOPATHIC MEDICINE

OST 686  Global Health: Mexico - Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course. P: IM 618 or approval of college RB: Fluency in Spanish to interact with patients R: Open to graduate-professional students in the College of Osteopathic Medicine or approval of college. Observation of and supervised participation in host country’s healthcare delivery system. Etiology, treatment, and control of endemic disease. Exploration of local culture and history. 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 Summer 2019 Effective Spring 2020
OST 687  Global Health: Peru - Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course. RB: Fluency in Spanish to interact with patients R: Open to graduate-professional students in the College of Osteopathic Medicine or approval of college.
Observation of and supervised participation in host country’s healthcare delivery system. Etiology, treatment, and control of endemic disease. Exploration of local culture and history. Offered second half of semester.
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 Summer 2019 Effective Spring 2020

OST 688  Global Health: Cuba - Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Osteopathic Medicine or approval of college.
Observation of and supervised participation in host country’s healthcare delivery system. Etiology, treatment, and control of endemic disease. Exploration of local culture and history.
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 Summer 2019 Effective Spring 2020

OST 690  Global Health: Dominican Republic - Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Osteopathic Medicine or approval of college.
Observation of and supervised participation in host country’s healthcare delivery system. Etiology, treatment, and control of endemic disease. Exploration of local culture and history.
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 Summer 2019 Effective Spring 2020

OST 694  Global Health: Nepal - Clinical Immersion
Fall of every year. Spring of every year. Summer of every year. 1 to 6 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Osteopathic Medicine or approval of college.
Observation of and supervised participation in host country’s healthcare delivery system. Etiology, treatment, and control of endemic disease. One Health. Exploration of local culture and history.
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 Summer 2019 Effective Spring 2020
OST 821  One Health—Transdisciplinary Collaborations to Global Health
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Transdisciplinary collaboration amongst different animal health, human health, and non-health specialists to solve problems at the interface of people, animals, and their environment.
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 2019  Effective Spring 2020

OST 822  Introduction to Global Health Practice
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Differences in national models of healthcare delivery, issues of social justice and human rights principles, and strategies to engage marginalized and vulnerable populations.
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 2019  Effective Spring 2020

OST 823  Global Burden of Disease
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Major causes of, types of, and efforts to reduce morbidity and mortality around the world.
Techniques for monitoring and validating the health status of populations.
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 2019  Effective Spring 2020

OST 824  Emerging Topics in Global Health
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Emerging topics in global health and connections to current issues.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Spring 2020

OST 825  Ethical Issues in Global Health
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
International standards for protection of human subjects. Social justice and human rights principles within the global context.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Spring 2020

OST 827  Global Health Management
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Leadership and management within the context of global healthcare, including interprofessional and intercultural values and communication.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Spring 2020
OST 828 Global Health Capstone
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Integration of knowledge, skills and competencies acquired in global health.
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 2020

OST 829 Global Health Community Assessment
Fall of every year. Spring of every year. Summer of every year. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to graduate students in the College of Osteopathic Medicine or approval of college.
Assessment of community health scenarios. Techniques for collaboration and co-creation with community partners.
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 2019 Effective Spring 2020

OST 831 Evidence-Based Practice in Global Health
Fall of every year. Spring of every year. Summer of every year. 3 credits. R: Open to master's students in the College of Osteopathic Medicine or approval of college.
Critical appraisal of scientific studies of global health interventions.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Spring 2020

COLLEGE OF VETERINARY MEDICINE

LCS 625 Equine Hard Health Clerkship
Equine Primary Care Clerkship
Fall of every year. 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.
Establishment and maintenance of equine herd health programs. Reproduction, parasite control, immunization, and diagnostic medicine and surgery in the field.
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 2019

PHM 816 Integrative Toxicology: Mechanisms, Pathology and Regulation
Fall of odd years. 3(3-0) Interdepartmental with Animal Science and Biochemistry and Molecular Biology and Pathobiology and Diagnostic Investigation. R: PHM 819
Effective Fall 2007 Effective Fall 2019
VM 130  Comparative Anatomy for Veterinary Technicians
Comparative Anatomy for Veterinary Nurses
Fall of every year. 2(1-2) P: (Completion of Tier I Writing Requirement and (BS 161 and BS 171)) or LB 145 P: ((Completion of Tier I Writing Requirement) and (BS 161 and BS 171)) or LB 145 R: Approval of college. C: VM 250 concurrently.
Gross anatomy of the common animal species encountered in veterinary medicine.
Overview of the functional anatomy of the musculoskeletal, digestive, cardiovascular, cutaneous, respiratory, urogenital, nervous, and endocrine systems and the special senses.
Effective Fall 2013  Effective Fall 2019

VM 140  Pharmacology for Veterinary Technicians
Pharmacology for Veterinary Nurses
Fall of every year. 2(2-0) P: MTH 103 or MTH 110 or MTH 116 or MTH 124 or MTH 132 P: ((MTH 101 and MTH 103) or MTH 103) and (MTH 114 or MTH 116 or MTH 124 or MTH 132 or MTH 152H) R: Approval of college.
Fundamentals of characteristics, classification and usage of veterinary pharmaceuticals.
Introduction to and application of dosage and formulation calculations.
Effective Spring 2013  Effective Fall 2019

VM 155  Veterinary Technology Careers and Professional Development
Veterinary Nursing Careers and Professional Development
Spring of every year. 1(1-0) R: Approval of college.
Career options in veterinary technology, discussion of professional, ethical and legal considerations. Portfolio development, resume and cover-letter writing skills. Career options in veterinary nursing, discussion of professional, ethical and legal considerations. Portfolio development, resume and cover-letter writing skills.
Effective Spring 2013  Effective Fall 2019

VM 170  Hematology and Immunology for Veterinary Technicians
Hematology and Immunology for Veterinary Nurses
Spring of every year. 2(2-0) P: VM 250 and VM 110 C: VM 175 concurrently.
Structure and function of normal blood cells, cellular and humoral immunity, mechanisms of hemostasis, blood group serology, transfusion medicine and vaccinology.
Effective Spring 2013  Effective Fall 2019

VM 175  Clinical Pathology Laboratory I for Veterinary Technicians
Clinical Pathology Laboratory I for Veterinary Nurses
Spring of every year. 1(0-2) P: VM 110 and VM 250 C: VM 170 concurrently.
Veterinary clinical pathology laboratory including diagnostic procedures in hematology, serology and ELISA methodology.
Effective Spring 2013  Effective Fall 2019

VM 176  Clinical Pathology Laboratory II for Veterinary Technicians
Clinical Pathology Laboratory II for Veterinary Nurses
Fall of every year. 1(0-2) P: VM 175
Comprehensive veterinary clinical pathology laboratory, including diagnostic procedures in urology, dermatology, cytology, and advanced methods in hematology
Effective Spring 2013  Effective Fall 2019

VM 205  Preventive Animal Health Care for Veterinary Technicians
Preventive Animal Health Care for Veterinary Nurses
Spring of every year. 3(3-0) P: VM 150 and VM 110
Development of husbandry techniques to enhance wellness and reduce the risk of disease, injury and stress in common domestic and exotic animals.
Effective Spring 2013  Effective Fall 2019
VM 210  Surgical Nursing for Veterinary Technicians  
Surgical Nursing for Veterinary Nurses  
Fall of every year. 2(1-1) P: VM 160 and VM 130 and VM 250 R: Approval of department. C: VM 215 concurrently and VM 303 concurrently.  
Role of the veterinary technician as a member of the veterinary surgical team. Role of the veterinary nurse as a member of the veterinary surgical team.  
Effective Fall 2015 Effective Fall 2019

VM 245  Parasitology for Veterinary Technicians  
Parasitology for Veterinary Nurses  
Spring of every year. 2(1-2) P: VM 140 and VM 176 and VM 205 RB: VM 250  
Parasites of veterinary and public health importance, including gross and microscopic morphology, transmission, and control.  
Effective Spring 2013 Effective Fall 2019

VM 265  Dentistry Techniques for Veterinary Technicians  
Dentistry Techniques for Veterinary Nurses  
Spring of every year. 1(0-4) P: VM 215 and VM 210 and VM 303  
Veterinary dental techniques and oral cavity assessment for companion animals.  
Effective Spring 2013 Effective Fall 2019

VM 270  Advanced Skills Development for Veterinary Technicians  
Advanced Skills Development for Veterinary Nurses  
Spring of every year. 1(0-3) P: VM 210 and VM 215 and VM 303  
Service-oriented approach to health care development in an operational animal care facility.  
Effective Spring 2013 Effective Fall 2019

VM 285  Clinical Nutrition for Veterinary Technologists  
Clinical Nutrition for Veterinary Nurses  
Fall of every year. Spring of every year. 1(1-0) P: VM 255 and VM 120  
Nutritional assessment and management of common domestic species in veterinary medicine.  
Effective Spring 2013 Effective Spring 2020

VM 295  Biomedical Research and Regulatory Issues for Veterinary Technologists  
Biomedical Research and Regulatory Issues for Veterinary Nurses  
Fall of every year. 1(1-0) P: VM 150 and VM 205  
Principles and techniques of biomedical research, governance and regulation of animal care and use.  
Effective Spring 2013 Effective Fall 2019

VM 303  Anesthesiology for Veterinary Technicians  
Anesthesiology for Veterinary Nurses  
Fall of every year. 2(1-1) P: VM 140 and VM 160 and VM 130 and VM 250 R: Approval of department. C: VM 215 concurrently and VM 210 concurrently.  
Effective Fall 2015 Effective Fall 2019

VM 304  Radiology for Veterinary Technicians  
Radiology for Veterinary Nurses  
Spring of every year. 2(1-2) P: VM 110 and VM 130  
Production of radiographs, components of the x-ray machine, use of screens and grids, handling film, imaging quality, film processing, patient positioning, and radiation safety.  
Effective Spring 2013 Effective Fall 2019
VM 305  Hospital Practice Management for Veterinary Technologists  
Hospital Practice Management for Veterinary Nurses  
Spring of every year. 2(2-0) P: VM 150  
Veterinary practice economics, personnel management, inventory control and marketing techniques.  
Effective Spring 2013 Effective Fall 2019

VM 410  Veterinary Technology Clerkship in Anesthesiology  
Veterinary Nursing Clerkship in Anesthesiology  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: (VM 270 and VM 275 and VM 245 and VM 304) and completion of Tier I writing requirement RB: Completion of preclinical course work.  
Application of principles and techniques in anesthesiology.  
Effective Spring 2019 Effective Fall 2019

VM 411  Veterinary Technology Clerkship in Radiology  
Veterinary Nursing Clerkship in Radiology  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 270 and VM 275 and VM 245 and VM 304 RB: Completion of preclinical coursework.  
Application of principles and techniques in radiology.  
Effective Spring 2013 Effective Fall 2019

VM 412  Veterinary Technology Clerkship in Companion Animal Medicine  
Veterinary Nursing Clerkship in Companion Animal Medicine  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: (VM 270 and VM 275 and VM 245 and VM 304) and completion of Tier I writing requirement RB: Completion of preclinical coursework.  
Application of principles and techniques in restraint, examination, nursing care, monitoring, and preventive medicine of companion animals.  
Effective Spring 2019 Effective Fall 2019

VM 413  Veterinary Technology Clerkship in Companion Animal Surgery  
Veterinary Nursing Clerkship in Companion Animal Surgery  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 270 and VM 275 and VM 245 and VM 304 RB: Completion of preclinical coursework.  
Application of principles and techniques in surgical nursing.  
Effective Spring 2013 Effective Fall 2019

VM 414  Veterinary Technology Clerkship in Equine Medicine and Surgery  
Veterinary Nursing Clerkship in Equine Medicine and Surgery  
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. P: VM 270 and VM 275 and VM 304 RB: Completion of preclinical coursework.  
Application of principles and techniques in equine medicine and surgery.  
Effective Spring 2013 Effective Fall 2019

VM 415  Veterinary Technician Clerkship in Food Animal and Equine Medicine and Surgery  
Veterinary Nursing Clerkship in Food Animal and Equine Medicine and Surgery  
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. P: VM 270 and VM 275 and VM 304 RB: Completion of preclinical coursework.  
Application of principles and techniques in food animal and equine medicine and surgery.  
Effective Spring 2013 Effective Fall 2019

VM 450  Veterinary Technology Clerkship in Emergency Medicine  
Veterinary Nursing Clerkship in Emergency Medicine  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: (VM 410 and VM 411 and VM 413) and Completion of preclinical coursework.  
Application of principles and techniques in emergency medicine.  
Effective Spring 2013 Effective Fall 2019
VM 451  Veterinary Technology Clerkship in Cardiology
Veterinary Nursing Clerkship in Cardiology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: (VM 410 and VM 411 and VM 413) and Completion of preclinical coursework.
Application of principles and techniques in cardiology.
Effective Spring 2013 Effective Fall 2019

VM 452  Veterinary Technology Clerkship in Neurology
Veterinary Nursing Clerkship in Neurology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: (VM 410 and VM 411 and VM 413) and Completion of preclinical coursework.
Application of principles and techniques in neurology and physical therapy.
Effective Spring 2013 Effective Spring 2019

VM 453  Veterinary Technology Clerkship in Ophthalmology
Veterinary Nursing Clerkship in Ophthalmology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 and VM 413 RB: (VM 410) and Completion of preclinical coursework.
Application of principles and techniques in ophthalmology.
Effective Spring 2013 Effective Fall 2019

VM 454  Veterinary Technology Clerkship in Critical Care
Veterinary Nursing Clerkship in Critical Care
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: (VM 410 and VM 411 and VM 413) and Completion of preclinical coursework.
Application of principles and techniques in critical care.
Effective Spring 2013 Effective Summer 2019

VM 455  Veterinary Technology Clerkship in Companion Animal Oncology
Veterinary Nursing Clerkship in Companion Animal Oncology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 and VM 413 RB: Completion of preclinical coursework.
Application of principles and techniques in companion animal oncology.
Effective Spring 2013 Effective Fall 2019

VM 456  Veterinary Technology Clerkship in Companion Animal Physical Rehabilitation
Veterinary Nursing Clerkship in Companion Animal Physical Rehabilitation
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: Completion of preclinical coursework.
Application of principles and techniques of companion animal physical rehabilitation, particularly those animals recovering from orthopedic and neurologic injuries and surgeries.
Effective Spring 2013 Effective Fall 2019

VM 458  Veterinary Technology Clerkship in Companion Animal Diagnostic Ultrasound
Veterinary Nursing Clerkship in Companion Animal Diagnostic Ultrasound
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 411 RB: Completion of preclinical coursework.
Application of principles and techniques of Diagnostic Ultrasound
Effective Spring 2013 Effective Fall 2019

VM 466  Veterinary Technology Clerkship in Large Animal Anesthesia
Veterinary Nursing Clerkship in Large Animal Anesthesia
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 270 and VM 275 and VM 303 and VM 304 RB: Completion of preclinical coursework.
Application of principles and techniques of food animal and equine anesthesiology.
SA: VM 460, VM 472
Effective Spring 2013 Effective Fall 2019
VM 470  Veterinary Technology Clerkship in Food Animal Medicine
Veterinary Nursing Clerkship in Food Animal Medicine
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. P: VM 270 and VM 275 and VM 304 RB: Completion of preclinical coursework.
Application of principles and techniques in food animal medicine.
Effective Spring 2013 Effective Fall 2019

VM 480  Veterinary Technology Clerkship in Clinical Pathology
Veterinary Nursing Clerkship in Clinical Pathology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 270 and VM 275 and VM 303 and VM 245 RB: Completion of preclinical coursework.
Application of principles and techniques in clinical pathology.
Effective Spring 2013 Effective Fall 2019

VM 482  Veterinary Technology Clerkship in Necropsy
Veterinary Nursing Clerkship in Necropsy
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 270 and VM 275 and VM 303 and VM 245 RB: Completion of preclinical coursework.
Application of principles and techniques in postmortem examination of common domestic species with emphasis on specimen description, collection, and submission.
Effective Spring 2013 Effective Fall 2019

VM 483  Veterinary Technology Clerkship in Biomedical Research
Veterinary Nursing Clerkship in Biomedical Research
Fall of every year. Spring of every year. Summer of every year. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: VM 270 and VM 275 and VM 303 and VM 304 and VM 245 RB: (VM 410 and VM 482) and Completion of preclinical coursework.
Application of principles and techniques in biomedical research involving laboratory animals.
Effective Spring 2013 Effective Fall 2019

VM 484  Veterinary Technology Clerkship in Zoo and Wildlife Medicine
Veterinary Nursing Clerkship in Zoo and Wildlife Medicine
Fall of every year. Spring of every year. Summer of every year. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: VM 270 and VM 275 and VM 303 and VM 304 and VM 245 RB: (VM 410) or Completion of preclinical coursework.
Application of principles and techniques in zoo and wildlife medicine.
Effective Spring 2013 Effective Fall 2019

VM 486  Veterinary Technology Clerkship in Clinical Parasitology
Veterinary Nursing Clerkship in Clinical Parasitology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 245 RB: Completion of preclinical coursework.
Application of principles and techniques in clinical parasitology.
Effective Spring 2013 Effective Fall 2019

VM 487  Veterinary Technology Clerkship in Dermatology
Veterinary Nursing Clerkship in Dermatology
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: VM 412 RB: Completion of pre-clinical course work.
Application of principles and techniques in dermatology.
Effective Spring 2013 Effective Fall 2019

VM 490  Veterinary Technology Clerkship in Special Problems
Veterinary Nursing Clerkship in Special Problems
Fall of every year. Spring of every year. Summer of every year. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: VM 270 and VM 275 and VM 303 and VM 304 and VM 245 RB: Completion of preclinical coursework.
Application of principles and techniques in experimental, therapeutic, or laboratory medicine.
Effective Spring 2013 Effective Fall 2019
VM 693  Companion Animal Behavior Clerkship
Spring of every year. 3(3-0) R: Open to veterinary medicine students in the College of Veterinary Medicine or approval of college.

NEW  The primary focus of this clerkship will be participation in referral veterinary behavior cases during which the veterinary student will be actively involved in history acquisition, as well as development of treatment plans. Additional experiences may include clinical applications of veterinary behavior in companion animal primary care practice and in the shelter environment.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
Effective Spring 2020