PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Request to delete the curriculum and degree requirements for the Agricultural Technology Certificate in Applied Plant Sciences in the Institute for Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

No new students are to be admitted to the program effective Fall 2017. No students are to be readmitted to the program effective Fall 2017. Effective Summer 2018, coding for the program will be discontinued and the program will no longer be available in the Institute for Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate through the Institute for Agricultural Technology prior to Summer 2018 will have to change their certificate.

2. Request to delete the curriculum and degree requirements for the Agricultural Technology Certificate in Beef Cattle Management in the Institute for Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

No new students are to be admitted to the program effective Fall 2017. No students are to be readmitted to the program effective Fall 2017. Effective Summer 2018, coding for the program will be discontinued and the program will no longer be available in the Institute for Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate through the Institute for Agricultural Technology prior to Summer 2018 will have to change their certificate.

3. Request to delete the curriculum and degree requirements for the Agricultural Technology Certificate in Grounds Management in the Institute for Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

No new students are to be admitted to the program effective Fall 2017. No students are to be readmitted to the program effective Fall 2017. Effective Summer 2018, coding for the program will be discontinued and the program will no longer be available in the Institute for Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate through the Institute for Agricultural Technology prior to Summer 2018 will have to change their certificate.

4. Request to delete the curriculum and degree requirements for the Agricultural Technology Certificate in Landscape and Lawn Management in the Institute for Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

No new students are to be admitted to the program effective Fall 2017. No students are to be readmitted to the program effective Fall 2017. Effective Summer 2019, coding for the program will be discontinued and the program will no longer be available in the Institute for Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate through the Institute for Agricultural Technology prior to Summer 2019 will have to change their certificate.
5. Request to delete the curriculum and degree requirements for the **Agricultural Technology Certificate** in **Swine Management** in the Institute for Agricultural Technology. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

No new students are to be admitted to the program effective Fall 2017. No students are to be readmitted to the program effective Fall 2017. Effective Summer 2018, coding for the program will be discontinued and the program will no longer be available in the Institute for Agricultural Technology. Students who have not met the requirements for the Agricultural Technology Certificate through the Institute for Agricultural Technology prior to Summer 2018 will have to change their certificate.

6. Request to change the requirements for the **Bachelor of Science** degree in **Fisheries and Wildlife** in the Department of Fisheries and Wildlife.

*The concentrations in the Bachelor of Science degree in Fisheries and Wildlife 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 Fisheries and Wildlife** make the following changes:

1. Delete item 3. a. (2).
2. Renumber 3. a. (3) to 3. a. (2).
3. Delete the following note in item 3. a.:
   
   Students pursuing the Preveterinary concentration must complete either group (2) or group (3).
4. In item 3. c. (2) delete the following course:
   
   **ENT 319 Introduction to Earth System Science**
   
   3
5. In item 3. e. delete the following course:
   
   **CSUS 325 Study and Practice of Communication for Sustainability (W)**
   
   3
6. In item 3. f. delete the following courses:
   
   **FW 438 Philosophy of Ecology (W)**
   
   3
   **PHL 484 Philosophy of Biological Science**
   
   3
7. In item 3. g. change the requirement to ‘Complete at least 3 credits from’.
8. In item 3. h. change ‘ZOL 355’ to ‘IBIO 355’.
9. In item 3. j. in the **Conservation Biology** concentration make the following changes:
   (a) Change the total credits from ‘24 to 26’ to ‘27 to 29’.
   (b) In item (1) change ‘FW 443’ to ‘PLB 443’ and ‘ZOL 445’ to ‘IBIO 445’.
   (c) In item (2) change ‘ZOL 485’ to ‘IBIO 485’.
   (d) In item (3) change ‘ZOL 341’ to ‘IBIO 341’.
   (e) In item (4) add the following course:
   
   **FW 454 Environmental Hydrology for Watershed Management**
   
   3
   (f) In item (5) change ‘EEP 255’ to ‘EEM 255’ and ‘ZOL 446’ to ‘IBIO 446’.
(g) In item (6) change ‘ZOL 360, 365, and 384’ to ‘IBIO 360, 365, and 384’.

(10) In item 3. j. in the **Fisheries Biology and Management** concentration make the following changes:

(a) In item (4) change ‘ZOL 306’ to ‘IBIO 306’.

(b) In item (6) change ‘ZOL 328 and 341’ to ‘IBIO 328 and 341’ and delete the following course:

ZOL 483 Environmental Physiology (W) 4

(11) In item 3. j. in the **Wildlife Biology and Management** concentration make the following changes:

(a) In item (2) change ‘ZOL 360, 365, and 384 to ‘IBIO 360, 365, and 384’.

(b) In item (4) delete the following course:

PLB 335 Plants Through Time 3

(c) In item (5) change ‘ZOL 328 and 341’ to ‘IBIO 328 and 341’ and delete the following course:

ZOL 483 Environmental Physiology (W) 4

(12) In item 3. j. in the **Water Sciences** concentration make the following changes:

(a) In item (4) change ‘ZOL 306’ to ‘IBIO 306’.

(d) In item (6) change ‘ZOL 303, 341, and 353’ to ‘IBIO 303, 341, and 353’ and delete the following course:

ZOL 483 Environmental Physiology (W) 4

(13) In item 3. j. in the **Fish and Wildlife Disease Ecology and Management** concentration make the following changes:

(a) Change the total credits from ‘33 to 35’ to ‘30 or 31’.

(b) In item (1) change the total credits from ‘24’ to ‘20’ and delete the following course:

EPI 390 Disease in Society: Introduction to Epidemiology and Public Health 4

(c) In item (1) change ‘ZOL 341 and 445’ to ‘IBIO 341 and 445’.

(d) In item (4) delete the following course:

ZOL 316 General Parasitology 3

(e) In item (4) change ‘ZOL 306, 360, 365, and 384’ to ‘IBIO 306, 360, 365, and 384’.

(14) In item 3. j. in the **Preveterinary** concentration make the following changes:

(a) Change the total credits from ‘38 or 39’ to ‘27 or 28’.

(b) In item (1) change the total credits from ‘31’ to ‘24’ and delete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMG 301</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MMG 302</td>
<td>Introductory Laboratory for General and Allied Health Microbiology</td>
<td>1</td>
</tr>
<tr>
<td>MMG 409</td>
<td>Eukaryotic Cell Biology</td>
<td>3</td>
</tr>
</tbody>
</table>
(c) Delete items (2) and (3) and add the following new item (2):

One of the following courses (3 or 4 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANS 314</td>
<td>Genetic Improvement of Domestic Animals</td>
<td>4</td>
</tr>
<tr>
<td>ANS 409</td>
<td>Problems, Controversies and Advancements in Reproduction</td>
<td>3</td>
</tr>
<tr>
<td>ANS 435</td>
<td>Mammary Physiology</td>
<td>4</td>
</tr>
<tr>
<td>ANS 445</td>
<td>Equine Exercise Physiology</td>
<td>4</td>
</tr>
<tr>
<td>ANS 455</td>
<td>Avian Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BLD 434</td>
<td>Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>IBIO 341</td>
<td>Fundamental Genetics</td>
<td>4</td>
</tr>
<tr>
<td>IBIO 408</td>
<td>Histology</td>
<td>4</td>
</tr>
<tr>
<td>IBIO 425</td>
<td>Cells and Development (W)</td>
<td>4</td>
</tr>
<tr>
<td>IBIO 450</td>
<td>Cancer Biology (W)</td>
<td>3</td>
</tr>
<tr>
<td>MMG 301</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MMG 409</td>
<td>Eukaryotic Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>MMG 451</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>NEU 300</td>
<td>Neurobiology</td>
<td>3</td>
</tr>
<tr>
<td>PSL 310</td>
<td>Physiology for Pre-Health Professionals</td>
<td>4</td>
</tr>
</tbody>
</table>

Effective Fall 2018

7. Request to change the requirements for the Minor in Conservation, Recreation and Environmental Enforcement in the Department of Fisheries and Wildlife.

a. Under the heading Minor in Conservation, Recreation and Environmental Enforcement make the following change:

(1) Under the heading Environmental Attitudes, Policy and Law delete the following course:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOL 446</td>
<td>Environmental Issues and Public Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Add the following course:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBIO 446</td>
<td>Environmental Issues and Public Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Effective Fall 2018.

8. Request to change the requirements for the Minor in Marine Ecosystem Management in the Department of Fisheries and Wildlife.

a. Under the heading Minor in Marine Ecosystem Management make the following changes:

(1) Under the heading Marine Ecosystem Management change ‘ZOL 303 and ZOL 353’ to ‘IBIO 303 and IBIO 353’.

(2) Under the heading Biodiversity change ‘ZOL 306’ to ‘IBIO 306’.

(3) Under the heading Biodiversity change the credits of ‘PLB 424’ from ‘4’ to ‘3’.

(4) Under the heading Experiential Learning in Marine Ecosystem Management change ‘ZOL 496 and ZOL 498’ to ‘IBIO 496 and IBIO 498’.

Effective Fall 2018.
1. Request to change the requirements in the Bachelor of Science degree in Mechanical Engineering in the Department of Mechanical Engineering.

The concentrations in the Bachelor of Science degree in Mechanical Engineering 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 Mechanical Engineering make the following changes:

(1) In item 3. a. delete the following course and change the total credits from '17' to '13':

CSE 231 Introduction to Programming I 4

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

ME 371 Mechanical Design I 3
ME 471 Mechanical Design II 3

Add the following courses:

ME 370 Mechanical Design and Manufacturing I 3
ME 470 Mechanical Design and Manufacturing II 3

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

ME 456 Mechatronic System Design 3

Add the following courses:

ME 413 Cryogenic-Thermal Systems 3
ME 414 Mechanical Design of Cryogenic Systems 3
ME 441 Aerodynamics and Aircraft Performance 3

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

ME 456 Mechatronic System Design 3

Add the following courses:

ME 414 Mechanical Design of Cryogenic Systems 3
ME 478 Product Development 3

(5) Add the following two concentrations:

Concentration in Aerospace Engineering

A concentration in Aerospace Engineering is available to, but not required of, any student enrolled in the Bachelor of Science degree in Mechanical Engineering. Completing the Bachelor of Science degree in Mechanical Engineering with a concentration in Aerospace Engineering may require more than 128 credits. The concentration will be noted on the student's transcript.

Aerospace Engineering

A mechanical engineering degree with the aerospace engineering concentration recognizes the expertise of students in subjects related to aerospace applications and to the aerospace industry, which provides many career opportunities for mechanical engineering graduates. Students who meet the requirements of this concentration will have expertise in aerodynamics, propulsion and structures, supplemented by other strengths in the core Mechanical Engineering degree program. To complete a Bachelor of Science degree in mechanical engineering with an aerospace engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:
Crédits
All of the following courses (9 credits):
ME 440 Aerospace Propulsion 3
ME 441 Aerodynamics and Aircraft Performance 3
ME 475 Computer Aided Design of Structures 3
One of the following courses (3 credits):
ME 422 Introduction to Combustion 3
ME 426 Introduction to Composite Materials 3
ME 433 Introduction to Computational Fluid Dynamics 3
ME 442 Turbomachinery 3
ME 464 Intermediate Dynamics 3

Concentration in Cryogenic Engineering

A concentration in Cryogenic Engineering is available to, but not required of, any student enrolled in the Bachelor of Science degree in Mechanical Engineering. Completing the Bachelor of Science degree in Mechanical Engineering with a concentration in Cryogenic Engineering may require more than 128 credits. The concentration will be noted on the student’s transcript.

Cryogenic Engineering

A mechanical engineering degree with the cryogenic engineering concentration recognizes the expertise of students in thermal and mechanical analysis and design techniques as applied to cryogenic engineering applications. To complete a Bachelor of Science degree in mechanical engineering with a cryogenic engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following courses (12 credits):

Crédits
All of the following courses (12 credits):
ME 413 Cryogenic-Thermal Systems 3
ME 414 Mechanical Design of Cryogenic Systems 3
ME 416 Computer Assisted Design of Thermal Systems 3
ME 442 Turbomachinery 3

(6) Under the heading Biomedical Engineering concentration make the following change:

Delete the following course:
BE 445 Biosensors for Medical Diagnostics 3

Add the following course:
BE 444 Biosensors for Medical Diagnostics 3

(7) Under the heading Manufacturing Engineering concentration make the following changes:

Delete the following course:
EC 210 Economics Principles Using Calculus 3

Add the following requirement:
One of the following courses (3 credits):
ACC 230 Survey of Accounting Concepts 3
EC 201 Introduction to Microeconomics 3

Effective Fall 2018.
COLLEGE OF NATURAL SCIENCE

1. 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. a. change the total credits from ‘60 to 68’ to ‘64 to 70’.
      (2) In item 3. a. (1) change the credits from ‘7’ to ‘11’ and add the following course:
          CMSE 201 Introduction to Computational Modeling 4
      (3) In item 3. a. (8) reletter item (c) to item (d) and add the following new item (c):
          PHY 241 Physics for Cellular and Molecular Biologists I 4
          PHY 242 Physics for Cellular and Molecular Biologists II 4

   Effective Summer 2018.

2. Request to change the requirements for the Bachelor of Science degree in Biochemistry and Molecular Biology/Biotechnology in the Department of Biochemistry and Molecular Biology.
   a. Under the heading Requirements for the Bachelor of Science Degree in Biochemistry and Molecular Biology/Biotechnology make the following changes:
      (1) In item 3. a. change the total credits from ‘65 to 75’ to ‘66 to 73’.
      (2) In item 3. a. (1) change the credits from ‘7’ to ‘11’ and add the following course:
          CMSE 201 Introduction to Computational Modeling 4
      (3) Delete item 3. a. (6):
          One of the following courses (3 or 4 credits):
          CSE 131 Technical Computing and Problem Solving 3
          CSE 231 Introduction to Programming I 4
      (4) Renumber items 3. a. (7), (8), (9), (10), (11), and (12) respectively.
      (5) In item 3. a. (8) reletter item (c) to (d) and add the following (c):
          (c) PHY 241 Physics for Cellular and Molecular Biologists I 4
          PHY 242 Physics for Cellular and Molecular Biologists II 4

   Effective Summer 2018.

3. Request to delete the curriculum and degree requirements for the Bachelor of Science degree in Computational Chemistry in the Department of Chemistry. The University Committee on Undergraduate Education (UCUE) provided consultative commentary to the Provost after considering this request. The Provost made the determination to discontinue the program after considering the consultative commentary from the University Committee on Undergraduate Education.

   No new students are to be admitted to the program effective Summer 2013. No students are to be readmitted to the program effective Summer 2018. Effective Spring 2021, coding for the program will be discontinued and the program will no longer be available in the Department of Chemistry. Students who have not met the requirements for the Bachelor of Science degree in Computational Chemistry through the Department of Chemistry prior to Spring 2021 will have to change their major.
4. Request to change the requirements for the **Bachelor of Science** degree in **Astrophysics** in the Department of Physics and Astronomy.

   a. Under the heading **Requirements for the Bachelor of Science Degree in Astrophysics** replace the entire entry with the following:

   a. The following courses outside the Department of Physics and Astronomy (33 to 39 credits):

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

          | Course Code | Course Name                      | Credit Hours |
          |-------------|----------------------------------|--------------|
          | BS 161      | Cell and Molecular Biology       | 3            |
          | BS 162      | Organismal and Population Biology| 3            |
          | BS 181H     | Honors Cell and Molecular Biology| 3            |
          | BS 182H     | Honors Organismal and Population Biology| 3 |
          | ENT 205     | Pests, Society and Environment   | 3            |
          | IBIO 150    | Integrating Biology: from DNA to Populations| 3 |
          | LB 144      | Biology I: Organismal Biology    | 4            |
          | LB 145      | Biology II: Cellular and Molecular Biology| 5 |
          | MMG 141     | Introductory Human Genetics      | 3            |
          | MMG 201     | Fundamentals of Microbiology     | 3            |
          | PLB 105     | Plant Biology                    | 3            |
          | PSL 250     | Introductory Physiology          | 4            |

      (2) One of the following groups of courses (8 to 10 credits):

          (a) CEM 141  General Chemistry   4
          (b) CEM 142  General and Inorganic Chemistry| 3
          (c) CEM 161  Chemistry Laboratory I | 1
          (d) CEM 151  General and Descriptive Chemistry| 4
          (e) CEM 152  Principles of Chemistry  3
          (f) CEM 161  Chemistry Laboratory I | 1
          (g) CEM 181H Honors Chemistry I | 4
          (h) CEM 182H Honors Chemistry II | 4
          (i) CEM 185H Honors Chemistry Laboratory I | 2
          (j) LB 171  Principles of Chemistry I   4
          (k) LB 171L Introductory Chemistry Laboratory I | 1
          (l) LB 172  Principles of Chemistry II  3

      (3) One of the following groups of Mathematics courses (12 to 14 credits):

          (a) MTH 132  Calculus I          3
          (b) MTH 133  Calculus II         4
          (c) MTH 234  Multivariable Calculus| 4
          (d) MTH 235  Differential Equations| 3
          (e) MTH 152H Honors Calculus I   3
          (f) MTH 153H Honors Calculus II  4
          (g) MTH 254H Honors Multivariable Calculus| 4
          (h) MTH 235  Differential Equations| 3
          (i) MTH 340  Ordinary Differential Equations I | 3
          (j) LB 118  Calculus I           4
          (k) LB 119  Calculus II          4
          (l) LB 220  Calculus III         4
          (m) MTH 235  Differential Equations| 3
          (n) MTH 340  Ordinary Differential Equations I | 3

      (4) The following course (4 credits):

          CMSE 201 Introduction to Computational Modeling | 4

b. The following courses in the Department of Physics and Astronomy:

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

          | Course Code | Course Name                      |
          |-------------|----------------------------------|
          | AST 207     | The Science of Astronomy         | 3            |
          | AST 208     | Planets and Telescopes           | 3            |
          | AST 304     | Stars                            | 3            |
          | AST 308     | Galaxies and Cosmology           | 3            |
          | AST 410     | Senior Thesis                    | 4            |

   Students must enroll for a total of 4 credits of AST 410. This is normally split over two semesters.

   (2) One of the following groups of Physics courses (8 to 10 credits):

          (a) PHY 183  Physics for Scientists and Engineers I | 4
          (b) PHY 184  Physics for Scientists and Engineers II | 4
PHY 191  Physics Laboratory for Scientists, I  1
PHY 192  Physics Laboratory for Scientists, II  1
(b)  PHY 193H  Honors Physics I- Mechanics  4
PHY 294H  Honors Physics II - Electromagnetism  4
PHY 191  Physics Lab for Scientists I  1
PHY 192  Physics Lab for Scientists II  1
(c)  LB 273  Physics I  4
LB 274  Physics II  4
(3)  All of the following courses (15 credits):
PHY 215  Thermodynamics and Modern Physics  3
PHY 321  Classical Mechanics I  3
PHY 410  Thermal and Statistical Physics  3
PHY 471  Quantum Physics I  3
PHY 481  Electricity and Magnetism I  3

Effective Fall 2018.

5. Request to change the requirements for the Bachelor of Science degree in Physics in the Department of Physics and Astronomy. The Teacher Education Council (TEC) will consider this request at its April 2, 2018 meeting.

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

(1)  In item 3. a. change the total credits from ‘23 to 28’ to ‘33 to 39’ and add the following courses:

BS 181H  Honors Cell and Molecular Biology  3
BS 182H  Honors Organismal and Population Biology  3
IBIO 150  Integrating Biology: From DNA to Populations  3
LB 144  Biology I: Organismal Biology  4
LB 145  Biology II: Cellular and Molecular Biology  5
MMG 141  Introductory Human Genetics  3

Delete the following course:
ZOL 141  Introductory Human Genetics  3

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

MTH 235  Differential Equations  3
or
MTH 340  Ordinary Differential Equations I  3

(2)  Renumber item 3. a. (4) to 3. a. (5) and add the following item 3. a. (4):

The following course (4 credits):
CMSE 201  Introduction to Computational Modeling  4

Effective Fall 2018.
COLLEGE OF NURSING

1. Request to establish a Graduate Certificate in Teaching in Nursing in the College of Nursing. The University Committee on Graduate Studies (UCGS) recommended approval of this request at its February 5, 2018 meeting.

The Graduate Certificate in Teaching in Nursing is a Type 2 graduate certificate and will appear on the transcript as “Graduate Certificate Program in Teaching in Nursing”.

a. Background Information:

National League for Nursing (NLN) and American Association of Colleges of Nursing (AACN) recognize the need for nurse educators to be prepared to teach in an academic environment. In addition, a growing number of academic programs and specialty practices are requiring educators to be certified as nurse educators as a condition of employment. Completion of the certificate program will prepare nurses who are qualified academically and experientially to fill nurse educator vacancies nationally. The courses currently are offered as part of the College of Nursing Clinical Nurse Specialist Master of Science in Nursing program, as a partial requirement for the Certificate in College Teaching program at MSU, and Nurse Faculty loan program. Graduates are qualified to sit for a national certification exam as an Academic Nurse Educator.

b. Academic Programs Catalog Text:

The Graduate Certificate in Teaching in Nursing program is designed to prepare graduate and post-graduate nurses with nurse educator competencies in preparation for teaching in clinical and academic settings. Students will develop skills in facilitating learning, curriculum development, educational technology, and assessment and evaluation strategies. The program includes a total of 90 hours of student teaching under the direct supervision of a College of Nursing preceptor. Graduates meet the requirements to sit for the National League for Nursing (NLN) Academic Nurse Educator certification exams. The Graduate Certificate in Teaching in Nursing is available only online.

Admission

To be considered for admission to the Graduate Certificate in Teaching in Nursing an applicant must:

1. Be enrolled in an MSU College of Nursing graduate program; an accredited graduate nursing program; or graduated from an accredited graduate program in nursing with a minimum 3.0 grade-point average on a 4.0 scale.
2. Have completed a bachelor’s in nursing degree from an accredited program with a minimum 3.0 grade-point average on a 4.0 scale.
3. Submit the university application form and fee if not currently enrolled at MSU.
4. Submit the admission application for the certificate program and CV/resume on the College of Nursing Web site.
5. Provide transcripts from all previous institutions of higher education.
6. Complete a test of English language proficiency if English is not the first language with a minimum average score of 550 with no subscore below 52 (paper version) or 79 with no subscore below 17 (internet based test). Equivalent scores on the MSU English Language Center Test may be submitted. If using the International English Language Testing System (IELTS), the minimum average score must be 6.5.
7. Hold an unrestricted RN license in the applicant’s state or country.
8. Complete an admission interview.

Requirements for the Graduate Certificate in Teaching in Nursing

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUR 861</td>
<td>Curriculum Design in Nursing Education</td>
<td>3</td>
</tr>
<tr>
<td>NUR 866</td>
<td>Academic and Clinical Teaching Internship</td>
<td>3</td>
</tr>
<tr>
<td>NUR 868</td>
<td>Topics in Nursing Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Effective Fall 2018.
COLLEGE OF VETERINARY MEDICINE

1. Request to change the requirements for the Doctor of Veterinary Medicine degree in Veterinary Medicine in the College of Veterinary Medicine. The University Committee on Graduate Studies (UCGS) will consider this request at its April 9, 2018 meeting.

   a. Under the heading Admission to the Professional Program in Veterinary Medicine replace the entire entry with the following:

   The College of Veterinary Medicine strives to select individuals with the academic ability, motivation, emotional intelligence, and social competence to succeed as veterinary students and future veterinarians. Student diversity is promoted to help meet the needs of a diverse society. A wide variety of experiences are represented in each entering class, with academic backgrounds including the sciences, the arts and humanities, and various advanced degrees.

   A new class of students begins the four–year professional program each fall semester. Applications for admission and related materials must be received by the deadline as specified by the Veterinary Medical College Application Service (VMCAS).

   Factors considered by the Admissions Committee in determining an applicant’s relative competitive position are:

   1. Academic performance: A minimum last-3-semester grade-point average (GPA) in combination with a minimum prerequisite GPA of 3.0 is required for an application to receive review.

   2. File review of nonacademic experiences and attributes fitting to the values of the College.

   3. Multiple Mini Intervie ws (MMIs) by faculty, staff, alumni, and other vested individuals trained to assess for the qualities considered important for positive professional outcomes (by invitation).

   Applications, regular or transfer, are reviewed by the Committee on Student Admissions. Final selection of applicants is based on a combination of academic performance, evidence of significant accomplishments in nonacademic areas, and performance in MMIs.

   Applicants are considered for admission in the following order of priority:

   1. Residents of the state of Michigan, as defined by Michigan State University. (Since Michigan State University is a public, tax-assisted institution, admission priority is granted to residents of Michigan.)

   2. Residents of states other than Michigan, including U.S. Territories and Trust Possessions.

   3. All others.

   Requirements to be completed by students prior to enrollment:

   All prerequisite courses must be completed by the spring semester of the year of matriculation with a minimum grade of 2.0 in each course. Fifty percent of the science prerequisite courses must be complete at the time of application, with a minimum grade of 2.0 in each course.

   **Science Prerequisite Courses**
   College Algebra and Trigonometry (or precalculus or calculus)
   Physics I and II with laboratories
   Chemistry I with laboratory
   Introductory Biology I and II with laboratories
   Organic Chemistry I and II with laboratory
   Biochemistry
   Advanced Biology Elective (3 credit minimum), such as Cell Biology, Physiology, Neurobiology, Immunology, Genetics, Microbiology, or Histology

   Advanced Placement (AP) credits are accepted for College Algebra and Trigonometry, Physics I and II, Chemistry I, and Introductory Biology I and II.
General Education Requirements

Arts and Humanities - two courses that must include two of the following subject areas: history, literature, art/music/theatre history or appreciation, philosophy, and religion

Social Science - two courses that must include two of the following subject areas: cultural anthropology, economics, human geography, political science, psychology, and sociology

English - one course (3 semester credits) of English composition

Advanced Placement (AP) credits are accepted to fulfill any of these requirements.

b. Delete the PRODUCTION MEDICINE SCHOLARS ADMISSION PATHWAY.

c. Under the heading Requirements for the Doctor of Veterinary Medicine Degree in Veterinary Medicine replace the entire entry with the following:

VETERINARY MEDICINE (Year 1)

SEMESTER 1 (Fall) (19 credits)
VM 500 Veterinary Science I 2
VM 501 One Health I 1
VM 502 Veterinary Doctoring I 1
VM 503 Veterinary Care and Practice Management I 1
VM 515 Animals in Society 2
VM 516 Musculoskeletal System I 3
VM 517 Nervous System I 3
VM 518 Cardiovascular System I 3
VM 519 Cutaneous System I 3

SEMESTER 2 (Spring) (19 credits)
VM 504 One Health II 1
VM 505 Veterinary Doctoring II 1
VM 506 Veterinary Care and Practice Management II 1
VM 520 Respiratory System I 3
VM 523 Immunologic and Hematologic Systems I 3
VM 525 Endocrine System I 3
VM 527 Reproductive System I 2
VM 528 Urinary System I 2
VM 529 Digestive System I 3

VETERINARY MEDICINE (Year 2)

SEMESTER 3 (Fall) (19 credits)
VM 507 One Health III 1
VM 508 Veterinary Doctoring III 1
VM 509 Veterinary Care and Practice Management III 1
VM 530 Veterinary Science II 4
VM 531 Immunologic and Hematologic Systems II 3
VM 534 Cutaneous System II 3
VM 535 Reproductive System II 3
VM 536 Respiratory System II 3

SEMESTER 4 (Spring) (19 credits)
VM 510 One Health IV 1
VM 512 Veterinary Doctoring IV 1
VM 537 Veterinary Care and Practice Management IV 1
VM 565 Cardiovascular System II 2
VM 568 Urinary System II 3
VM 569 Digestive System II 3
VM 571 Musculoskeletal System II 2
VM 575 Nervous System II 3
VM 577 Endocrine System II 3
**VETERINARY MEDICINE** (Year 3)

**SEMESTER 5 (Fall) (19 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 538</td>
<td>One Health V</td>
<td>1</td>
</tr>
<tr>
<td>VM 539</td>
<td>Veterinary Career and Practice Management V</td>
<td>1</td>
</tr>
<tr>
<td>VM 578</td>
<td>Clinical Reasoning I</td>
<td>8</td>
</tr>
<tr>
<td>VM 579</td>
<td>Clinical Reasoning II</td>
<td>7</td>
</tr>
<tr>
<td>VM 580</td>
<td>Surgical and Anesthetic Skills</td>
<td>3</td>
</tr>
</tbody>
</table>

**SEMESTER 6 (Spring) (17 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 581</td>
<td>Clinical Reasoning III</td>
<td>5</td>
</tr>
<tr>
<td>VM 582</td>
<td>Veterinary Clinical Experience</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 9 credits of required or elective clerkships.

**VETERINARY MEDICINE** (Year 4)

**SEMESTERS 7 (Summer), 8 (Fall), and 9 (Spring)**

Students will be required to complete 30 required clerkship credits and an additional 15 credits of elective clerkship credits. Students complete their 9-credits of Preceptorship during Year 4 through enrollment in VM 611. The 9 credits in VM 611 must be completed in three consecutive, separate enrollments in consultation with the student's advisor. Satisfactory completion of semesters one through six of the professional curriculum is required for enrollment in any of the listed clerkships.

Effective Fall 2018.

2. Request to change the requirements for the **Master of Science** degree in **Integrative Pharmacology** in the Department of Pharmacology and Toxicology. The University Committee on Graduate Studies (UCGS) will consider this request at its April 9, 2018 meeting.

   a. Under the heading **Requirements for the Master of Science Degree in Integrative Pharmacology** make the following changes:

   (1) Replace the introductory statement with the following:

   The student must complete at least 31 credits under Plan B (without thesis). Students may not earn more than 9 credits at the 400-level.

   (2) Replace item 1. with the following:

   All of the following courses (16 to 19 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHM 819</td>
<td>Principles of Drug-Tissue Interactions</td>
<td>2</td>
</tr>
<tr>
<td>PHM 822</td>
<td>Academic and Research Integrity</td>
<td>1</td>
</tr>
<tr>
<td>PHM 830</td>
<td>Experimental Design and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHM 832</td>
<td>Applied Integrative Pharmacology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PHM 850</td>
<td>Communications for Biomedical Researchers</td>
<td>2</td>
</tr>
<tr>
<td>PHM 895</td>
<td>Applied Project in Integrative Pharmacology</td>
<td>3 to 6</td>
</tr>
<tr>
<td>PHM 982</td>
<td>Capstone Literature Review</td>
<td>2</td>
</tr>
</tbody>
</table>

   or

   (3) In item 2. Science electives, change the credits from '12 to 15' to 'as needed to total 31 credits for the degree) and add the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 803</td>
<td>Epidemiology and Public Health</td>
<td>3</td>
</tr>
<tr>
<td>HM 806</td>
<td>Environmental Factors of Health</td>
<td>3</td>
</tr>
<tr>
<td>HM 833</td>
<td>Introduction to Pharmaceutical Counterfeiting and Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHM 431</td>
<td>Pharmacology of Drug Addiction</td>
<td>3</td>
</tr>
<tr>
<td>PHM 461</td>
<td>Tropical Medicine Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHM 483</td>
<td>Antimicrobial Chemotherapy</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHM 659</td>
<td>Regulatory Affairs and Project Management in Clinical Research</td>
<td>3</td>
</tr>
</tbody>
</table>
PHM 850 Communications for Biomedical Researchers 2

Effective Fall 2018.

3. Request to change the requirements for the Master of Science degree in Pharmacology and Toxicology in the Department of Pharmacology and Toxicology. The University Committee on Graduate Studies (UCGS) will consider this request at its April 9, 2018 meeting.

a. Under the heading Requirements for the Master of Science Degree in Pharmacology and Toxicology make the following changes:

   (1) In item 1. delete the following course:
   PHM 980 Problems 2

   Add the following courses:
   PHM 850 Communications for Scientists 2
   PHM 982 Capstone Literature Review 2

   Change the total credits for item 1. from '8' to '10'.

   (2) In item 2. add the following courses:
   PHM 461 Tropical Medicine Pharmacology 2
   PHM 483 Antimicrobial Chemotherapy 3

   Change the total credits for item 2. from '24' to '21'.

   (3) In item 3. delete the following course:
   PHM 850 Communications for Biomedical Researchers 2

   (4) In the Pharmacology concentration delete items 2. and 3. and replace with the following:

   2. Other elective science courses:
   BLD 830 Concepts in Molecular Biology 2
   HM 803 Epidemiology and Public Health 3
   HM 806 Environmental Factors of Health 3
   PHM 450 Introduction to Chemical Toxicology 3
   PHM 461 Tropical Medicine Pharmacology 2
   PHM 483 Antimicrobial Chemotherapy 3
   PHM 817 Neurotoxicology 2
   PHM 828 Concepts of Carcinogenesis 2
   PHM 831 Endocrine Pharmacology and Toxicology 2
   PHM 833 Gastro-Intestinal and Liver Pharmacology and Toxicology 2
   PHM 840 Safety Pharmacology 2
   PHM 841 Cellular and Molecular Toxicology 3
   VM 812 Food Safety Toxicology 3

   3. Professional Elective Courses (not more than 5 credits):
   BLD 842 Managing Biomedical Laboratory Operations 2
   PHM 851 Intellectual Property and Patent Law for Biomedical Sciences 2
   PHM 854 Leadership and Team-Building for Biomedical Research 2
   PHM 855 The Business of Biomedical Research Organizations 2
   PHM 857 Project Management 2
   PHM 858 Drug Development Process 3

   (5) In the Toxicology concentration delete items 2. and 3. and replace with the following:
2. Other elective science courses:
   BLD  830  Concepts in Molecular Biology    2
   HM  803  Epidemiology and Public Health    3
   HM  833  Introduction to Pharmaceutical  
            Counterfeiting and Public Health   3
   PHM  430  Human Pharmacology            3
   PHM  431  Pharmacology of Drug Addiction 3
   PHM  461  Tropical Medicine Pharmacology 2
   PHM  483  Antimicrobial Chemotherapy  3
   PHM  813  Cardiovascular Pharmacology and Toxicology 3
   PHM  829  Neuropharmacology            2
   PHM  831  Endocrine Pharmacology and Toxicology 2
   PHM  833  Gastro-Intestinal and Liver Pharmacology  
            and Toxicology     2
   PHM  834  Respiratory Pharmacology      2
   PHM  835  Biopharmaceuticals: Development to Manufacturing 3
   PHM  837  Autonomic Pharmacology       1
   PHM  840  Safety Pharmacology          2

3. Professional Elective Courses (Not more than 5 credits):
   BLD  842  Managing Biomedical Lab Operations 2
   PHM  851  Intellectual Property and Patent Law for  
            Biomedical Sciences  2
   PHM  854  Leadership and Team-Building for  
            Biomedical Research      2
   PHM  855  The Business of Biomedical Research  
            Organizations            2
   PHM  857  Project Management            2
   PHM  858  Drug Development Process       3

Effective Fall 2018.
PART II - NEW COURSES AND CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

FSC 820  Regulatory Leadership in Food Law
Spring of every year. 3(3-0) RB: (FSC 811) or prior coursework in food science, food law, or food
safety Not open to students with credit in LAW 810U.
NEW  Introduction to regulatory affairs through the regulation of food.
      Effective Summer 2018

FSC 821  Wine, Beer, and Spirits Laws and Regulations
Spring of every year. 3(3-0) RB: (FSC 811) or prior coursework in food safety, food laws, or food
safety Not open to students with credit in LAW 810Y.
NEW  Laws, regulations, and policies that govern alcoholic beverages in the United States.
      Effective Summer 2018

FSC 851  FSMA FSVP Rule
Summer of even years. 3(3-0) RB: (FSC 811) or prior coursework in food safety, food law, or food
science Not open to students with credit in LAW 810V.
NEW  Legal perspective of FDA’s Foreign Supplier Verification Program of the Food Safety
      Modernization Act.
      Effective Summer 2018

FSC 852  FSMA Preventive Controls Rule
Fall of even years. 3(3-0) RB: (FSC 811) or prior coursework in food safety, food law, or food
science Not open to students with credit in LAW 810W.
NEW  Legal perspective of FDA’s Preventive Controls for Human Food Rule of the Food Safety
      Modernization Act.
      Effective Summer 2018

FSC 853  FSMA Produce Safety Rule
Fall of even years. 3(3-0) RB: (FSC 811) or prior coursework in food safety, food law, or food
science Not open to students with credit in LAW 810X.
NEW  Legal perspective of FDA’s Produce Safety Rule of the Food Safety Modernization Act.
      Effective Summer 2018

COLLEGE OF ENGINEERING

ME 285  Computer Aided Design Tools
Fall of every year. Spring of every year. 3(0-6) P: ME 280 R: Open to students in the College of
      Engineering.
      Advanced 3-D solid modeling
      SA: MSM 260
      DELETE COURSE
      Effective Summer 2018

ME 300  Professional Issues in Mechanical Engineering
Fall of every year. Spring of every year. 1(1-0) P: Completion of Tier I Writing Requirement R:
      Open to undergraduate students in the Mechanical Engineering Major. R: Open to juniors or
      seniors in the Mechanical Engineering Major.
      Professional conduct and ethical behavior in the workplace. Practice in professional
      writing and oral presentation. Global, economic, environmental and societal context of
      engineering. Contemporary issues in engineering. Group dynamics and working in teams.
      Intellectual property.
      Effective Spring 2018 Effective Fall 2018
ME 370  Mechanical Design and Manufacturing I
Fall of every year. Spring of every year. 3(3-0) P: (ME 222 and (ME 300 or concurrently) and ME 391) and completion of Tier I writing requirement R: Open to juniors or seniors in the Mechanical Engineering Major.
NEW  Engineering design of machine elements and mechanical systems. Computer-based analysis in support of design. Design for static and fatigue strength, deflection, and reliability.
SA: ME 471
Effective Fall 2018

ME 371  Mechanical Design I
Fall of every year. Spring of every year. 3(3-0) P: ME 361 or concurrently R: Open to juniors or seniors in the Mechanical Engineering Major.
Analysis of displacement, velocity and acceleration in mechanical linkages. Kinematics and dynamics of machines.
DELETE COURSE
Effective Summer 2018

ME 385  Computer Aided Design Tools
Spring of every year. 3(0-6) P: ME 280 R: Open to students in the College of Engineering.
NEW  Advanced 3-D solid modeling
SA: ME 285
Effective Fall 2018

ME 412  Heat Transfer Laboratory
Fall of every year. Spring of every year. 2(1-2) P: (ME 410) and completion of Tier I writing requirement P: (ME 410 or concurrently) and completion of Tier I writing requirement R: Open to juniors or seniors in the Mechanical Engineering Major.
Practices and measurement techniques for heat transfer and thermal systems.
Experimental problem solving applied to heat transfer.
Effective Fall 2014 Effective Fall 2018

ME 413  Cryogenic-Thermal Systems
Spring of every year. 3(3-0) P: ME 410 or concurrently R: Open to juniors or seniors in the Mechanical Engineering Major.
NEW  Low temperature properties of materials and fluids. Introduction to cryogenic liquefaction and refrigeration cycles, separation and purification systems, instrument systems for low temperature measurement, fluid storage and distribution, vacuum technology.
Effective Fall 2018

ME 414  Mechanical Design of Cryogenic Systems
Fall of every year. 3(3-0) P: ME 470 or concurrently R: Open to juniors or seniors in the Mechanical Engineering Major.
NEW  Engineering mechanical design of cryogenic refrigeration fluid systems. Design, analysis and introduction to ASME codes pertaining to piping systems/components, vacuum insulated transfer-lines, cold boxes, and superconducting magnet cooling.
Effective Fall 2018

ME 425  Experimental Mechanics
Fall of odd years. Fall of every year. 3(2-3) P: (ME 322) P: ME 222 R: Open to students in the College of Engineering.
Measurement of stress, strain, vibration, and motion using strain gauges, accelerometers, photoelasticity, holography, Moire patterns, laser speckle and electronic imaging.
Transducer design.
SA: MSM 405
Effective Fall 2014 Effective Fall 2018
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 441</td>
<td>Aerodynamics and Aircraft Performance</td>
<td>Spring of every year. 3(3-0) P: ME 332 R: Open to juniors or seniors in the Mechanical Engineering Major.</td>
</tr>
<tr>
<td></td>
<td>NEW</td>
<td>Solutions to inviscid and viscous fluid dynamical equations. Aerodynamics of airfoils, wing and fuselage. Aircraft performance parameters and basics of flight, including cruise, turning, takeoff and landing. Introduction to stability, including control surfaces, longitudinal and lateral stability and power effects. Effective Fall 2018</td>
</tr>
<tr>
<td>ME 464</td>
<td>Intermediate Dynamics</td>
<td>Fall of every year. Spring of every year. 3(3-0) P: (ME 361) R: Open to students in the College of Engineering. Kinematics and kinetics of particle and rigid body systems. Virtual work, Lagrangian method, and Euler equations. Basic vibrations of discrete and continuous systems. Elementary wave propagation. SA: MSM 403 Effective Fall 2014 Effective Fall 2018</td>
</tr>
<tr>
<td>ME 465</td>
<td>Computer Aided Optimal Design</td>
<td>Spring of every year. 3(3-0) P: (ME 222 and ME 280) and (ME 371 or concurrently) P: (ME 222 and ME 280) and (ME 370 or concurrently) R: Open to juniors or seniors in the Mechanical Engineering Major. Modeling for mechanical design optimization. Algorithms for constrained and unconstrained optimization. Optimality criteria. Optimization using finite element models. Design projects. Effective Fall 2014 Effective Fall 2018</td>
</tr>
<tr>
<td>ME 470</td>
<td>Mechanical Design and Manufacturing II</td>
<td>Fall of every year. Spring of every year. 3(3-0) P: ME 361 and ME 370 R: Open to juniors or seniors in the Mechanical Engineering Major. Kinematic analysis of linkage mechanisms, spur gears and cam-follower systems, design project. SA: ME 371 Effective Fall 2018</td>
</tr>
<tr>
<td>ME 471</td>
<td>Mechanical Design II</td>
<td>Fall of every year. Spring of every year. 3(3-0) P: ME 222 and ME 371 and ME 391 R: Open to juniors or seniors in the Mechanical Engineering Major. Engineering design of machine elements and mechanical systems. Computer-based analysis in support of design. Design for static and fatigue strength, deflection, and reliability. DELETE COURSE Effective Fall 2018</td>
</tr>
<tr>
<td>ME 475</td>
<td>Computer Aided Design of Structures</td>
<td>Fall of every year. 3(3-0) P: ME 471 or concurrently P: ME 370 R: Open to juniors or seniors in the Mechanical Engineering Major. Computational methods for analysis, design, and optimization of structural components. Basic concepts in geometric modeling, finite element analysis, and structural optimization. Effective Fall 2014 Effective Fall 2018</td>
</tr>
<tr>
<td>ME 481</td>
<td>Mechanical Engineering Design Projects</td>
<td>Fall of every year. Spring of every year. 3(1-6) P: (ME 410 and ME 471) and completion of Tier I Writing requirement P: (ME 410 and ME 470) and completion of Tier I writing requirement R: Approval of department; application required. Application of design concepts in mechanical engineering. Problem definition, design specifications. Modeling and analysis methods. Design optimization, economics, reliability. Manufacturing considerations in design. Capstone design projects. Effective Fall 2014 Effective Fall 2018</td>
</tr>
</tbody>
</table>
ME 497  Biomechanical Design in Product Development  
Spring of every year. 3(3-0) Interepartmental with Biomedical Engineering. P: ME 371 or concurrently P: ME 370 or concurrently R: Open to juniors or seniors in the Department of Mechanical Engineering.  
Biomechanical product design with application to people or animals. Synthesis, prototyping, and analysis of designs. Project management. Market research.  
SA: BME 491A, MSM 445  
Effective Fall 2014 Effective Fall 2018

COLLEGE OF NATURAL SCIENCE

CEM 161  Chemistry Laboratory I  
Fall of every year. Spring of every year. Summer of every year. 1(0-3) P: (CEM 141 or concurrently) or (CEM 151 or concurrently) or (CEM 181H or concurrently) or (LB 171 or concurrently) Not open to students with credit in CEM 185H or LB 171L.  
Experiments in general chemistry; stoichiometry, calorimetry, electrochemistry, molecular geometry, gas laws, kinetics, acids and bases, and inorganic chemistry. This project based course introduces basic chemistry laboratory techniques. Topics/techniques covered may include measurements, chemical reactions and basic spectroscopy. Students work in groups to design and execute their own multi-week experiments, in order to solve problems outlined in a project scenario. Students then engage in argumentation from evidence, ultimately resulting in a variety of common reports (lab report, poster, oral presentation, etc.)  
Effective Fall 2013 Effective Fall 2017

CEM 162  Chemistry Laboratory II  
Fall of every year. Spring of every year. Summer of every year. 1(0-3) P: CEM 161 or CEM 185H or LB 171L RB: (CEM 142 or concurrently) or (CEM 152 or concurrently) or (CEM 182H or concurrently) Not open to students with credit in LB 172L.  
Analytical and inorganic chemistry; redox and acid base titrations; spectrophotometric and gravimetric analysis; preparation and analysis of coordination complexes of nickel, iron, and cobalt. This project based course is a continuation of CEM 161, with the students exploring more complex techniques and topics. Topics/techniques may include kinetics, thermochemistry, titration, and synthesis. Students work in groups to design and execute their own multi-week experiments, in order to solve problems outlined in a project scenario. Students then engage in argumentation from evidence, ultimately resulting in a variety of common reports (lab report, poster, oral presentation, etc.)  
Effective Fall 2013 Effective Fall 2017

GLG 481  Reservoirs and Aquifers  
Fall of every year. Spring of odd years. 3(2-2) P: GLG 431 or concurrently  
Effective Fall 2017 Effective Fall 2018

MTH 101  Quantitative Literacy I  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: (MTH 1825 or MTH 103) or designated score on Mathematics Placement test  
Quantitative literacy including applications to health and risk, science, and the environment.  
Effective Fall 2016 Effective Summer 2018

MTH 102  Quantitative Literacy II  
Fall of every year. Spring of every year. Summer of every year. 3 credits. P: (MTH 1825 or MTH 103) or designated score on Mathematics Placement test  
Quantitative literacy including applications to finance, economics, and politics.  
Effective Fall 2016 Effective Summer 2018
MTH 103  College Algebra  
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: (MTH 1825) or designated score on Mathematics Placement test Not open to students with credit in MTH 116 or MTH 103B.  
Number systems; functions and relations; exponents and logarithms; elementary theory of equations; inequalities; and systems of equations.  
SA: LBS 117  
Effective Fall 2013 Effective Fall 2018

MTH 103A  College Algebra I  
Fall of every year. 3(3-0) Not open to students with credit in MTH 103 or MTH 116.  
NEW  
The first semester of a 2-semester College Algebra course. Topics include: functions, graphing, and modeling, with a focus on linear functions and models.  
Request the use of the Pass-No Grade (P-N) system.  
Effective Fall 2018

MTH 103B  College Algebra II  
Spring of every year. 3(3-0) P: MTH 103A Not open to students with credit in MTH 103 or MTH 116.  
NEW  
The second semester of a 2-semester College Algebra course. Topics include: functions, graphing, and modeling, with a focus on exponential, logarithmic, polynomial, and rational functions.  
Effective Spring 2019

NSC 840  Writing in the Sciences  
Fall of every year. Spring of every year. 2(2-0) Interdepartmental with Arts and Letters. A student may earn a maximum of 6 credits in all enrollments for this course.  
Discussion and critique of students' writing in peer response workshop groups  
Request the use of the Pass-No Grade (P-N) system.  
DELETE COURSE  
Effective Spring 2018

STT 191  Selected Topics in Statistics  
Fall of every year. Spring of every year. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
NEW  
Topics in Statistics and Probability selected to complement existing courses.  
Effective Fall 2018

COLLEGE OF OSTEOPATHIC MEDICINE

OST 689  Introduction to Global Health & Culture – Cap Haitian, HAITI  
Fall of every year. Spring of every year. Summer of every year. 3 to 6 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 or in the College of Osteopathic Medicine or in the College of Nursing.  
NEW  
Introduce students to the health care delivery model in Haiti while experiencing the country's rich culture. This elective includes rotations in primary care clinics and hospitals along with lectures and presentations by Haitian health care officials.  
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 2018
COLLEGE OF VETERINARY MEDICINE

PDI 514   Veterinary Neurosciences  
Fall of every year. 2(2-0) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Introduction to the sensory, motor, and the special senses systems as they relate to domestic animals.  
DELETE COURSE  
Effective Fall 2018

PDI 518   Comparative Veterinary Gross Anatomy I  
Fall of every year. 4(2-6) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Introduction to canine anatomy through lectures and dissection.  
DELETE COURSE  
Effective Fall 2018

PDI 519   Comparative Veterinary Gross Anatomy II  
Spring of every year. 4(2-6) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Introduction to comparative anatomy of all domestic animals through lectures and dissection. Clinically relevant anatomy.  
DELETE COURSE  
Effective Spring 2019

PDI 520   Veterinary Tissue Structure and Function  
Fall of every year. 4(3-3) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Microscopic anatomy and cellular physiology of vertebrate tissues. Introduction to the use of the microscope.  
DELETE COURSE  
Effective Fall 2018

PDI 521   Veterinary Organ Microanatomy  
Spring of every year. 2(1-3) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Microanatomy of organ systems and relationship of structure to function.  
DELETE COURSE  
Effective Spring 2019

PDI 870   Laboratory Animal Pathology  
Summer of odd years. 2(1-2) RB: Background in histopathology, veterinary medicine, and systemic pathology R: Approval of department.  
REINSTATEMENT  
Diseases and pathology of laboratory animal species including mice, rats, ferrets, rabbits, primates, and fish, including current use of laboratory animals for toxicological pathology in industry.  
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 2018

PHM 850   Communications for Biomedical Researchers  
Communications for Scientists  
Fall of every year. Summer of every year. 2(2-0) R: Open to master’s students or lifelong graduate students in the College of Osteopathic Medicine or in the Department of Pharmacology and Toxicology or in the Integrative Pharmacology Major or in the Pharmacology and Toxicology Major.  
Effective research and business communication, including written and verbal skills for a variety of audiences and purposes. Effective research and business communication, including written skills for scientific audiences.  
Effective Fall 2014 Effective Fall 2017
PHM 982  Master of Science Capstone Literature Review
Fall of every year. Spring of every year. Summer of every year. 1 to 2 credits. A student may earn a maximum of 2 credits in all enrollments for this course. P: PHM 850 RB: Completion of at least 24 credits of MS program. R: Open to master’s students in the Integrative Pharmacology Major or in the Pharmacology and Toxicology Major. Approval of department. R: Open to master’s students in the Integrative Pharmacology Major or in the Pharmacology and Toxicology Major. Approval of department. A student may earn a maximum of 2 credits

NEW  Advisor-supervised literature research and writing of a 15-20 page fully-referenced critical review paper on a relevant topic in pharmacology and toxicology.
Effective Spring 2018

PSL 513  Animal Physiology for Veterinarians
Spring of every year. 4(4-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

Physiology of the neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive systems, and thermoregulation.
DELETE COURSE
Effective Spring 2019

VM 500  Veterinary Science I
Fall of every year. 2(1-2) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Introduction to veterinary science. Evidence based medicine; host, animal and environmental interactions in health.
Effective Fall 2018

VM 501  One Health I
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

Effective Fall 2018

VM 502  Veterinary Doctoring I
Fall of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Introduction to professionalism, basic communication skills, effective use of teams, medical ethics, health records, confidentiality, professional use of social media, and safe veterinary practices. Clinical doctoring skills, with emphasis on cutaneous, hematologic, immunologic, reproductive, and respiratory systems in health.
Effective Fall 2018

VM 503  Veterinary Career and Practice Management I
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Debt, budgets, financial risk assessment, financial planning, career development, work-life balance, and recognizing impaired physical or mental health and the need for professional help.
Effective Fall 2018

VM 504  One Health II
Spring of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Veterinary medicine and public health. Introduction to veterinary interactions with the public, including disaster response and crisis communication. Relevant laws, regulations, and regulatory agencies.
Effective Spring 2019
VM 505  Veterinary Doctoring II  
Spring of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Professionalism, communication, medical ethics, and social competence, including professional interactions, client communication, history taking, and recognizing cultural differences and their impact. Clinical doctoring skills, with emphasis on cardiovascular, digestive, endocrine, musculoskeletal, nervous, and urinary systems in health. Effective Spring 2019

VM 506  Veterinary Career and Practice Management II  
Spring of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Health teams, leadership, workplace behavior, DVM job market, and the process of securing DVM employment. Effective Spring 2019

VM 507  One Health III  
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Social issues of relevance to animals and the veterinary community. Emphasis on issues related to cutaneous, hematologic, immunologic, reproductive, and respiratory systems. Effective Fall 2019

VM 508  Veterinary Doctoring III  
Fall of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Professionalism, communication, medical ethics, social competence, and clinical doctoring skills, with emphasis on issues and skills involving disorders of the cutaneous, hematologic, immunologic, reproductive, and respiratory systems. Effective Fall 2019

VM 509  Veterinary Career and Practice Management III  
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Veterinary business finance including financial statement literacy and ratio analysis. Cost-of-care estimates and their communication to clients. Giving and receiving feedback, building positive work relationships, conflict management. Effective Fall 2019

VM 510  One Health IV  
Spring of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.

NEW  Social and medical issues of relevance to animals and the veterinary community. Emphasis on issues related to cardiovascular, digestive, endocrine, musculoskeletal, nervous, and urinary systems. Effective Spring 2020

VM 511  Clinical Competencies I  
Fall of every year. 2(1-2) R: Open to graduate-professional students in the College of Veterinary Medicine.

Introduction to history taking, physical examination, and techniques associated with examination of various species.

DELETE COURSE  Request the use of the Pass-No Grade (P-N) system.  
DELETE COURSE  Effective Fall 2018
VM 512  Veterinary Doctoring IV  
Spring of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Professionalism, communication, medical ethics, social competence, and clinical doctoring skills, with emphasis on issues and skills involving disorders of the cardiovascular, digestive, endocrine, musculoskeletal, nervous, and urinary systems. Writing prescriptions, discharge instructions, and patient records. Managing emotions in work settings.  
Effective Spring 2020

VM 515  Animals in Society  
Fall of every year. 2(1-2) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Role of animals and veterinary medicine in society. Intersections of animal behavior, animal welfare, ethics, public health and regulatory medicine.  
Effective Fall 2018

VM 516  Musculoskeletal System I  
Fall of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the musculoskeletal system in health  
Effective Fall 2018

VM 517  Nervous System I  
Fall of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the nervous system in health  
Effective Fall 2018

VM 518  Cardiovascular System I  
Fall of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the cardiovascular system in health  
Effective Fall 2018

VM 519  Cutaneous System I  
Fall of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the cutaneous system in health  
Effective Fall 2018

VM 520  Respiratory System I  
Spring of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the respiratory system in health  
Effective Spring 2019

VM 523  Immunologic and Hematologic Systems I  
Spring of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.  
NEW  Structure and function of the immunological and hematological systems in health  
Effective Spring 2019

VM 524  Basic Science in Clinical Medicine  
Spring of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Integration of information learned in basic science courses by application to clinical cases.  
DELETE COURSE  
Effective Spring 2019
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Delivery Schedule</th>
<th>Prerequisites</th>
<th>Notes</th>
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<tr>
<td>VM 525</td>
<td>Endocrine System I</td>
<td>Spring of every year. 3(1-4) R: Open to</td>
<td>Graduate-professional students in the College of Veterinary Medicine.</td>
<td>NEW: Structure and function of the</td>
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<td>endocrine system in health</td>
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<td>VM 527</td>
<td>Reproductive System I</td>
<td>Spring of every year. 2(1-2) R: Open to</td>
<td>Graduate-professional students in the College of Veterinary Medicine.</td>
<td>NEW: Structure and function of the</td>
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<td>reproductive system in health.</td>
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<td>VM 528</td>
<td>Urinary System I</td>
<td>Spring of every year. 2(1-2) R: Open to</td>
<td>Graduate-professional students in the College of Veterinary Medicine.</td>
<td>NEW: Structure and function of the</td>
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<td>VM 529</td>
<td>Digestive System I</td>
<td>Spring of every year. 3(1-4) R: Open to</td>
<td>Graduate-professional students in the College of Veterinary Medicine.</td>
<td>NEW: Structure and function of the</td>
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<td>digestive system in health</td>
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<tr>
<td>VM 530</td>
<td>Veterinary Science II</td>
<td>Fall of every year. 4(2-4) P: VM 500 and</td>
<td>VM 523 R: Open to graduate-professional students in the College of Veterinary</td>
<td>NEW: Host, agent, environment interaction</td>
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<td>Medicine.</td>
<td>for disease causation</td>
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<td>VM 531</td>
<td>Immunologic and Hematologic System II</td>
<td>Fall of every year. 3(1-4) P: VM 500 and</td>
<td>VM 523 R: Open to graduate-professional students in the College of Veterinary</td>
<td>NEW: Immunologic and hematologic disorders</td>
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<td>of animals</td>
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<td>VM 534</td>
<td>Cutaneous System II</td>
<td>Fall of every year. 3(1-4) P: VM 500 and</td>
<td>VM 519 R: Open to graduate-professional students in the College of Veterinary</td>
<td>NEW: Cutaneous system disorders of animals</td>
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<td>Medicine.</td>
<td>Effective Fall 2019</td>
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<td>VM 535</td>
<td>Reproductive System II</td>
<td>Fall of every year. 3(1-4) P: VM 500 and</td>
<td>VM 527 R: Open to graduate-professional students in the College of Veterinary</td>
<td>NEW: Reproductive system disorders of</td>
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<td>VM 536</td>
<td>Respiratory System II</td>
<td>Fall of every year. 3(1-4) P: VM 500 and</td>
<td>VM 520 R: Open to graduate-professional students in the College of Veterinary</td>
<td>NEW: Respiratory system disorders of</td>
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</table>
VM 537  Veterinary Career and Practice Management IV
Spring of every year. 1(0-2) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Professionalism, communication, medical ethics, social competence, and clinical doctoring skills, with emphasis on issues and skills involving disorders of the cardiovascular, digestive, endocrine, musculoskeletal, nervous, and urinary systems. Writing prescriptions, discharge instructions, and patient records. Managing emotions in work settings.
Effective Spring 2020

VM 538  One Health V
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Clinical problem-solving at the intersection of animal, human and environmental health.
Effective Fall 2020

VM 539  Veterinary Career and Practice Management V
Fall of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Medical records management, laws applicable to the practice of veterinary medicine, professional malpractice and board complaints, evaluating job offers, negotiating employment contracts, and interviewing.
Effective Fall 2020

VM 541  Veterinary Career Development and Practice Management
Spring of every year. 2(2-0) R: Open to graduate-professional students in the College of Veterinary Medicine.
Foundations of career development and practice management skills.
DELETE COURSE
Effective Spring 2019

VM 548  Principles of Diagnostic Imaging
Spring of every year. 1(1-0) R: Open to graduate-professional students in the College of Veterinary Medicine.
Basic principles of diagnostic imaging including radiographic physics, safety, interpretive principles and normal veterinary anatomy.
DELETE COURSE
Effective Spring 2019

VM 565  Cardiovascular System II
Spring of every year. 2(1-2) P: VM 530 and VM 518 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Cardiovascular system disorders of animals.
Effective Spring 2020

VM 568  Urinary System II
Spring of every year. 3(1-4) P: VM 530 and VM 528 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Urinary system disorders of animals.
Effective Spring 2020

VM 569  Digestive System II
Spring of every year. 3(1-4) P: VM 530 and VM 529 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Digestive system disorders of animals.
Effective Spring 2020

VM 571  Musculoskeletal System II
Spring of every year. 2(1-2) P: VM 530 and VM 516 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW Musculoskeletal disorders of animals
Effective Spring 2020
VM 575  Nervous System II
Spring of every year. 3(1-4) P: VM 530 and VM 517 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Nervous system disorders of animals.
Effective Spring 2020

VM 577  Endocrine System II
Spring of every year. 3(1-4) P: VM 530 and VM 525 R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Endocrine system disorders of animals.
Effective Spring 2020

VM 578  Clinical Reasoning I
Fall of every year. 8(2-12) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Clinical reasoning in veterinary medicine.
Effective Fall 2020

VM 579  Clinical Reasoning II
Fall of every year. 7(2-10) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Advanced clinical reasoning skill development. Complex cases that involve multiple systems, animal populations, and public health implications.
Effective Fall 2020

VM 580  Veterinary Surgery and Anesthesia
Fall of every year. 3(1-4) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Applied veterinary surgical and anesthesia skills.
Effective Fall 2020

VM 581  Clinical Reasoning III
Spring of every year. 5(2-6) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Advanced clinical reasoning skill development integrating societal, cultural, economic and ethical components of veterinary clinical decision-making.
Effective Spring 2021

VM 582  Veterinary Clinical Experience
Spring of every year. 3(0-6) R: Open to graduate-professional students in the College of Veterinary Medicine.
NEW  Veterinary clinical workplace skill development.
Effective Spring 2021