PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Request to change the requirements for the Master of Science degree in Fisheries and Wildlife in the Department of Fisheries and Wildlife. The University Committee on Graduate Studies (UCGS) will consider this request at its January 8, 2018 meeting.
   a. Under the heading Admission delete the last sentence of the paragraph:

   The Subject Test in Biology is recommended.

   b. Under the heading Requirements for the Master of Science Degree in Fisheries and Wildlife replace the paragraph with the following:

   The student may elect either Plan A (with thesis) or Plan B (without thesis). A total of 30 credits is required for the degree under either Plan A or Plan B. The student and the major professor plan a program of study that includes FW 894 and courses related to one or more of the areas of specialization within the field of fisheries and wildlife. Students are required to plan and execute a departmentally approved outreach experience, or in lieu of this, include FW 895 in their approved program. The program must be approved by the student’s guidance committee which includes at least two members in addition to the major professor, at least one of which is from the Department of Fisheries and Wildlife.

   Effective Summer 2018.

2. Request to change the requirements for the Doctor of Philosophy degree in Fisheries and Wildlife in the Department of Fisheries and Wildlife. The University Committee on Graduate Studies (UCGS) will consider this request at its January 8, 2018 meeting.
   c. Under the heading Admission replace the entire paragraph with the following:

   Applicants for a doctoral program should have completed a Bachelor of Science degree in a biological or other appropriate science. For some areas of specialization, additional background in mathematics, chemistry, botany, zoology, or a related Master of Science degree is desirable. Scores on the Graduate Record Examination General Test are required.

   d. Under the heading Requirements for the Doctor of Science Degree in Fisheries and Wildlife replace the paragraph with the following:

   The student and the major professor plan a program of study that includes FW 894 and courses related to one or more of the areas of specialization within the field of fisheries and wildlife. Students are required to plan and execute a departmentally approved outreach experience, or in lieu of, include FW 895 in their approved program. The program must be approved by the student’s guidance committee, which includes at least three members in addition to the major professor, at least one of who is from a department other than Fisheries and Wildlife and at least one of whom is from the Department of Fisheries and Wildlife.

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

   The optional concentration in the Bachelor of Science degree in Computer Engineering is 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 Computer Engineering make the following changes:

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

      ECE 480 Senior Design 4

      (2) Reletter item 3. e. to 3. d.

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

          One of the following courses (4 credits):
          ECE 480 Senior Design 4
          ECE 489 Independent Senior Design 4

   Effective Fall 2018.

2. Request to change the requirements in the Bachelor of Science degree in Electrical Engineering in the Department of Electrical and Computer Engineering.

   The optional concentration in the Bachelor of Science degree in Electrical Engineering is 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 Electrical Engineering make the following changes:

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

      ECE 480 Senior Design 4

      (2) Reletter item 3. c. and 3.d. to 3. d. and 3. e. respectively.

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

          One of the following courses (4 credits):
          ECE 480 Senior Design 4
          ECE 489 Independent Senior Design 4

   Effective Fall 2018.
COLLEGE OF HUMAN MEDICINE

1. Request to establish a Master of Arts degree in Clinical Medicine in the College of Human Medicine. The University Committee on Graduate Studies (UCGS) will consider this request at its October 9, 2017 meeting.

a. Background Information:

The mission of the Michigan State University (MSU) College of Human Medicine (CHM) is to educate exemplary physicians and scholars, discover and disseminate new knowledge, and provide service at home and abroad. CHM enhances their communities by providing outstanding primary and specialty care, promoting the dignity and inclusion of all people, and responding to the needs of the medically underserved (http://humanmedicine.msu.edu/About/Mission.htm). The CHM Office of Admissions uses a holistic approach of application review with the goal of matriculating a diverse student body who will ultimately serve a diverse population (http://humanmedicine.msu.edu/Admissions/Admissions_Office.htm). It is CHM’s hope that all students will be successful in their goals to attain the Doctor of Medicine (M.D.) degree. However, CHM is aware exceptions occur. The development of the Master of Arts Degree in Clinical Medicine aids those who have successfully completed the first two years of medical school but have decided, for personal or other reasons, not to pursue their M.D. degree. The Master of Arts Degree in Clinical Medicine will provide these students with recognition of the work done and skills learned in the Early (year 1) and Middle (year 2) Clinical Experience segments of the Shared Discovery Curriculum, helping them in their pursuit of alternative careers.

There are two categories of students who would be eligible to apply for the Master of Arts Degree in Clinical Medicine. First, a student who was highly successful in the first two years of medical school, but decided that they no longer want to pursue the profession of medicine, for personal or other reasons. Second, a student who struggled through the first two years of medical school, passed all of the required courses, but CHM has strong reservations that they would be successful in passing Step 1 of the United States Medical Licensing Examination and/or the clerkships in the Late Clinical Experience (years 3 and 4) of the curriculum to earn a M.D. degree.

The Master of Arts Degree in Clinical Medicine would be an adoption of the MSU CHM Shared Discovery Curriculum (SDC), with an additional requirement of research or equivalent capstone experience required to complete the degree. Since the SDC, by design, has been constructed to include early and ongoing longitudinal clinical experiences with a robust integration of basic and clinical sciences throughout the curriculum, students completing the first two years of the curriculum will have had significant patient contact and patient care experience in addition to education in basic and medical sciences. Thus, the Master of Arts Degree in Clinical Medicine would differ significantly from traditional Master of Science in Medical Science degrees offered by medical schools with a traditional 2 + 2 (two years of preclinical, basic science course work followed by two years of clinical education) curriculum.

Once the offer has been made by CHM, the student may or may not elect to switch from the M.D. to the M.A. program. The program should have minimal impact on the human or financial resources of MSU or CHM. Of the 190 students who matriculate each year, historically we predict no more than two per year would be eligible for the MA program. Currently enrolled students who have completed or are near completion of the first two years of medical school are eligible to apply. If, however, the student is struggling with professionalism issues, as opposed to academic struggles, they would not be eligible for the M.A. program. Once a student transfers into the M.A. program, they cannot return to pursuing the M.D. degree at MSU CHM. Dual degrees will not be conferred to those who successfully complete the four-year curriculum and receive the Doctorate of Medicine degree.
b. **Academic Programs Catalog Text:**

The Master of Arts Degree in Clinical Medicine provides longitudinal clinical experiences with a robust integration of basic and clinical sciences, including significant patient contact and patient care experience, in addition to education in basic and medical sciences.

In addition to meeting the requirements of the University as described in the *Graduate Education* section of this catalog, students must meet the requirements specified below.

**Admission**

To be considered for admission to the Master of Arts Degree in Clinical Medicine, students must:

1. be a currently enrolled College of Human Medicine medical student;
2. have successfully completed the first two years of medical school including HM 552, HM 553, and HM 554;
3. elect not to continue to completion of the M.D. degree.

Once a student transfers into the M.A. program, they cannot return to pursuing the M.D. degree at Michigan State University in the College of Human Medicine. Dual degrees will not be conferred to those who successfully complete the four-year curriculum and receive the Doctor of Medicine degree.

Students with critical deficiencies for the SCRIPT competency of professionalism as defined in the *Student Manual for Assessment and Promotion* are not eligible.

Dual degrees will not be conferred to those who successfully complete the four-year curriculum and receive the Doctorate of Medicine degree.

**Requirements for the Master of Arts Degree in Clinical Medicine**

The program is available under Plan B (without thesis). The student must complete a total of 35 credits distributed as follows:

1. Both of the following courses (32 credits):
   - HM 555 Medical School IV 16
   - HM 556 Medical School V 16
2. Completion of the following capstone course (3 credits):
   - HM 895 Clinical Medicine Capstone Experience 3

The capstone experience must be completed within one full semester of entry into the program. Students qualifying for an incomplete grade would be expected to complete the capstone experience no later than the middle of the student’s next semester, consistent with University policy.

*Effective Summer 2018.*
COLLEGE OF NATURAL SCIENCE

1. Request to change the requirements for the Graduate Certificate in Medical Neuroscience in the Program in Neuroscience. The University Committee on Graduate Studies (UCGS) will consider this request at its January 8, 2018 meeting.

   a. Under the heading Admission replace items 1. and 2. with the following:
      1. have a bachelor’s degree in a biological science background or equivalent work experience.
      2. have a minimum cumulative undergraduate grade-point average of 2.5 or a graduate grade-point average of 3.0.

   b. Under the heading Requirements for the Graduate Certificate in Medical Neuroscience replace item 2. with the following:
      At least 6 credits from the following courses:
      NEU 842 Neuroethics 2
      NEU 843 Methods for Assessing the Nervous System 3
      NEU 844 The Science and Ethics of Brain Interventions 2
      NEU 847 Development of the Nervous System 3
      NEU 890 Independent Student in Neuroscience 1 to 3
      PHM 431 Pharmacology of Drug Addiction 3

   Effective Summer 2018.

2. Request to change the requirements for the Bachelor of Science degree in Environmental Geosciences in the Department of Earth and Environmental Sciences.

   a. Under the heading Requirements for the Bachelor of Science Degree in Environmental Geosciences make the following changes:
      (1) In item 3. a. change the total credits from ‘24 to 26’ to ‘35 to 38’.
      (2) In item 3. a. (5) delete the following course:
          ZOL 303 Oceanography 4
          Add the following courses:
          FW 472 Limnology 3
          IBIO 303 Oceanography 4
      (3) In item 3. a. (7) delete the following course:
          ZOL 355 Ecology 3
          Add the following course:
          IBIO 355 Ecology 3
      (4) Replace item 3. c. with the following:
          One course from each of the following areas (9 or 10 credits):
          Hydrogeology Component
          CE 421 Engineering Hydrology 3
          FW 454 Environmental Hydrology for Watershed Management 3
          GEO 306 Environmental Geomorphology 3
          GLG 481 Reservoirs and Aquifers 3
          Geochemical Component
          CE 481 Environmental Chemistry – Equilibrium Concepts 3
          CEM 251 Organic Chemistry I 3
          CEM 311 Inorganic Chemistry 3
CEM 383  Introductory Physical Chemistry I    3
CSS 455  Pollutants in the Soil Environment    3
GLG 361  Igneous and Metamorphic Geochemistry and Petrology     4

**Geobiological Component**
ENE 487  Microbiology for Environmental Science and Engineering     3
FW 420  Stream Ecology      3
GLG 433  Vertebrate Paleontology     4
GLG 434  Evolutionary Paleontology     4
GLG 435  Geomicrobiology      4
IBIO 355  Ecology       3
MMG 425  Microbial Ecology      3

Students may not use IBIO 355 to count towards this requirement if used to fulfill requirement 3. a. (7).

Effective Summer 2018.

**COLLEGE OF OSTEOPATHIC MEDICINE**

1. Request to change the requirements for the **Professional Program in Osteopathic Medicine** leading to the Doctor of Osteopathic Medicine degree the College of Osteopathic Medicine. The University Committee on Graduate Studies (UCGS) will consider this request at its January 8, 2018 meeting.

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

   The science and practice of osteopathic medicine require an understanding of the relationships among the physical, biological, psychological, cultural, and environmental aspects of human behavior. Thus osteopathic education requires preparation in the natural, social, and behavioral sciences and the humanities. Candidates are expected to demonstrate their ability to work and think independently and in a scholarly manner. The mean grade-point average of students who are admitted to the program is 3.5 to 3.6.

   Applicants for admission to the first–year class in the college must meet the following minimum requirements:

   1. Completion of at least 90 semester credits within a college or university accredited by a regional accrediting commission of higher education.
   2. Completion of eight semester credits of biology with no grade below 2.0, including both course work and laboratory work in general biology or general zoology.
   3. Completion of 16 semester credits of chemistry, including three semester credits of biochemistry, with no grade below 2.0.
   4. Completion of 6 semester credits of English—including both oral and written English, with no grade below 2.0.
   5. The Medical College Admission Test (MCAT) must be taken by the end of September of the year application is being made. Scores may not be more than three years old.
   6. Suggested science course electives include anatomy, physiology, microbiology, histology, and statistics at the 300- and 400-levels.
   7. Suggested medical humanities and ethics electives include course work in philosophy, history of medicine and medical ethics.

   An application must be completed and all official transcripts submitted to the American Association of Colleges of Osteopathic Medicine Application Service (AACOMAS): it is highly recommended that the application be submitted no later than June 1 of the application year for students who wish to begin classes the following spring. The Michigan State University College of Osteopathic Medicine forwards to all applicants a secondary application. Early application is essential because the college admits its students on a rolling basis. Michigan State University College of Osteopathic Medicine classes begin in June. Most Admissions Committee reviews are conducted between September and March. Selection of students for the incoming class and for the waiting list is generally completed by early April.
b. Under the heading **Curriculum** replace the entire entry with the following:

The curriculum leading to the Doctor of Osteopathic Medicine (D.O.) degree includes six semesters of classroom and laboratory courses, one semester of classroom to clinic transitional course, and five semesters of community-based clinical courses. It is designed to meet the following educational objectives:

1. To assist students in the integration of basic science, behavioral science, and clinical science concepts related to the tenets of osteopathic philosophy.
2. To provide the student with comprehensive medical knowledge and skills which will serve as a foundation for a lifetime of learning.
3. To produce osteopathic physicians with the skills necessary to enable them to enter graduate medical education in a primary care, medical or surgery specialty program.

The curriculum is divided into two components: the preclerkship curriculum, presented in the first two years; and the clinical clerkship curriculum, scheduled in the third and fourth years.

**Preclerkship Curriculum**

Course focus in the first two semesters is on introductory basic sciences: anatomy, biochemistry, genetics, pathophysiology, cell biology, microbiology, immunology, and pharmacology. Courses in the following four semesters are focused on the body systems: neuromusculoskeletal, genitourinary, endocrine, reproductive, gastrointestinal, integumentary, pediatrics, hematopoietic, cardiovascular, respiratory and geriatrics with instructional input provided by basic science, behavioral science and clinical faculty.

Clinical skills developed through osteopathic patient care, preceptor and osteopathic manipulative medicine courses are offered in semesters two through six. In addition, the curriculum offers ethics, professionalism and law.

**Clerkship Curriculum**

The clinical clerkship curriculum includes 84 weeks of clinical training in community hospitals, clinics, and private practice offices affiliated with the college from across the State of Michigan.

The third year curriculum consists of 48 weeks, including ambulatory family medicine, ambulatory internal medicine, ambulatory or in-patient pediatrics, in-patient internal medicine, neurology, psychiatry, obstetrics/gynecology, general surgery, and emergency medicine each in 4-week blocks. In addition, anesthesia and radiology each in 2-week blocks.

The fourth year curriculum consists of 36 weeks. Of those 36 weeks, 16 are required to be completed within our Statewide Campus System hospitals. The remaining 20 weeks are required to be completed within either the Statewide Campus System or any institution approved by the College of Osteopathic Medicine with advanced planning and scheduling on the part of the student. Within the 36 weeks, students will be required to complete 8 weeks in a surgical field and 12 weeks in a medicine related field. A list of possible rotations for each field is available from the College of Osteopathic Medicine.

c. Under the heading **Requirements for Graduation** replace the entire entry with the following:

To graduate from Michigan State University with a Doctor of Osteopathic Medicine (D.O.) degree, a student must satisfactorily complete all required courses, pass COMLEX-USA Level 1, Level 2CE and Level 2PE examinations of the National Board of Osteopathic Medical Examiners.

In addition, each student must complete four years of Responsible Conduct of Research (RCR) training and receive the endorsement of the Committee on Student Evaluation (COSE) and an affirmative vote from the faculty of the College. The Policy for Promotion, Retention and Graduation is available to each student online upon admission to the College of Osteopathic Medicine.

Effective Summer 2018.
**PART II - NEW COURSES AND CHANGES**

**COLLEGE OF AGRICULTURE AND NATURAL RESOURCES**

**ANS 492  Undergraduate Research in Animal Science**
Fall of every year. Spring of every year. Summer of every year. 3(0-6) A student may earn a maximum of 6 credits in all enrollments for this course. P: (BS 161 or LB 145 or BS 181H) and (CEM 143 or CEM 251) and (ANS 313 or ANS 314 or ANS 315) R: Not open to freshmen or sophomores. Approval of department; application required.
Faculty supervised research in selected areas of animal science.
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 2014 Effective Summer 2017*

**AE 102  Electrical Lighting for Residential and Agricultural Facilities**
Fall of every year. Spring of every year. Summer of every year. 2(2-0) R: Not open to students in the Electrical Technology Major. Not open to students with credit in AE 085.
Introduction to electrical lighting sources, efficacies, productivity enhancement, and basic lighting design practices for residential and agricultural facilities.
*Effective Fall 2014 Effective Fall 2017*

**TSM 121  Fundamentals of Electricity**
Fall of every year. 4(3-2) R: Open to students in the Electrical Technology Major.
SA: AE 071
*Effective Fall 2014 Effective Fall 2017*

**TSM 343  Principles of Precision Agriculture**
Fall of every year. 3(2-2) Interdepartmental with Crop and Soil Sciences. P: MTH 103 or MTH 114 or MTH 116 or MTH 124 or MTH 132
*Effective Fall 2014 Effective Fall 2017*

**FW 207  Great Lakes: Biology and Management**
Fall of every year. Spring of every year. 3(3-0) Interdepartmental with Community Sustainability.
Living aquatic resources of the Great Lakes, environmental history, and biological resources and their management. Policy issues.
*Effective Fall 2014 Effective Spring 2018*

**FW 211  Introduction to Gender and Environmental Issues**
Spring of every year. 3(3-0) Interdepartmental with Criminal Justice and Community Sustainability and Environmental Economics and Policy and Forestry and Women's Studies.
DELETE COURSE
*Effective Spring 2018*
FW 238  Introductory Fisheries and Wildlife Field Experience  
Summer of every year. Summer of odd years. 3(1-4) RB: Introductory Biology, Botany, Zoology, Forestry, Natural Resources, Plant Biology, Fisheries and Wildlife course R: Approval of department; application required. 
Terrestrial and aquatic field research techniques and their application to current issues. Interaction with professionals. Field trips required. 
**Effective Fall 2014**  **Effective Fall 2017**

FW 810  Human Dimensions Research in Fisheries and Wildlife  
Spring of even years. Spring of odd years. 3(3-0)  
Quantitative and qualitative methods of involving the public in fish and wildlife management. Human dimensions research and current case studies. 
**Effective Spring 2010**  **Effective Fall 2018**

FW 840  Landscape Ecology  
Fall of even years. Spring of odd years. 3(2-2) RB: Knowledge or course work in the natural sciences, particularly ecological concepts, as well as exposure to GIS and data analysis. Ecological patterns and processes. Spatial variation in landscapes at multiple scales as affected by natural causes and human activity. Landscape ecology in natural resource decision-making and management. 
**Effective Spring 2010**  **Effective Fall 2018**

FW 894  Principles and Perspectives in Fisheries and Wildlife  
Fall of every year. 2(2-0) R: Open to graduate students in the Department of Fisheries and Wildlife or approval of department. 
NEW Multidisciplinary nature of conducting research applicable to the investigation, management, exploitation and conservation of fish and wildlife species, their habitats, and effects on human society  
Request the use of the Pass-No Grade (P-N) system. 
**Effective Spring 2018**

FW 895  Practice of Fisheries & Wildlife Outreach and Engagement  
Spring of every year. 2(2-0) R: Open to graduate students in the Department of Fisheries and Wildlife or approval of department. 
NEW Outreach and engagement practices, and participatory approaches used in managing natural resources. Science communication, outreach, and engagement skills. 
Request the use of the Pass-No Grade (P-N) system. 
**Effective Spring 2018**

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. Offered second half of semester. Career opportunities in food science; training in oral, written, and visual communication skills for professional development. 
**Effective Fall 2014**  **Effective Fall 2018**

FSC 325  Food Processing: Unit Operations  
Spring of every year. 3(3-0) P: FSC 211 or ANS 201  
Principles, technologies, and applications in conversion of raw products into high quality foods. Unit operations: thermal processing, irradiation, freezing, membrane fractionation, enzyme technologies, dehydration, and refrigeration. Field trip required. Principles, technologies, and applications in conversion of raw products into high quality foods. Unit operations: thermal processing, irradiation, freezing, membrane fractionation, enzyme technologies, dehydration, and refrigeration. 
SA: FSC 229, FSC 339  
**Effective Fall 2014**  **Effective Fall 2018**
FSC 421  Food Laws and Regulations
Spring of every year. Spring of odd years. Summer of every year. Summer of even years. 3(3-0) P: HNF 150 or FSC 211 or ABM 100
Adoption, interpretation, and enforcement of laws and regulations governing food processing and foodservice systems. Impact of regulation on food production, availability, marketing, and safety.
Effective Fall 2016 Effective Fall 2018

FSC 422  Advanced Professional Seminar in Food Science
Fall of every year. Spring of every year. 1(1-0) P: FSC 222 RB: Advanced course work in food science R: Open to students in the Food Science Major.
Preparation for success in food science careers, marketing tools, business communication skills, and contemporary topics in food science. Offered first half of semester.
Preparation for success in food science careers, marketing tools, business communication skills, and contemporary topics in food science.
Effective Fall 2014 Effective Fall 2018

FSC 892  Food Science and Animal Science Seminar
Food Science Seminar
Fall of every year. Spring of every year. 1(1-0) Interdepartmental with Animal Science A student may earn a maximum of 4 credits in all enrollments for this course. R: Open to graduate students in the Department of Animal Science or in the Department of Food Science and Human Nutrition. R: Open to graduate students in the Department of Food Science and Human Nutrition.
Effective Fall 2009 Effective Fall 2018

COLLEGE OF ENGINEERING

BE 482  Diffuse-Source Pollution Engineering
Engineering Ecological Treatment Systems
Spring of every year. 3(2-2) P: (BE 350 or ENE 483) and (BE 360 or ENE 487) 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.
Identification, estimation, and control of diffuse source pollution from agricultural and urban sources. Analysis of diffuse source pollutants in biological systems. Engineering design of practices and structures to prevent, mitigate, and treat diffuse source pollution, including low impact development (LID) strategies. 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 Spring 2016 Effective Fall 2018

CMSE 890  Selected Topics in Computational Mathematics, Science, and Engineering
Fall of every year. Spring of every year. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department. R: Open to graduate students.
Topics selected to supplement and enrich existing courses.
Effective Summer 2017 Effective Fall 2017
ECE 489  Independent Senior Design
Fall of every year. Spring of every year. Summer of every year. 4(4-0) P: (((ECE 303 and ECE 313 and ECE 320 and ECE 331 and ECE 366 and (ECE 390 or concurrently)) or approval of department) and completion of Tier I writing requirement) or (CSE 410 or approval of department) and (ECE 390 or concurrently or approval of department) R: Open to seniors in the Department of Electrical and Computer Engineering.
NEW
Individual design project with software and hardware components.
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 2018

COLLEGE OF HUMAN MEDICINE

EPI 835  Neuroepidemiology
Fall of odd years. Spring of odd years. 3(3-0) Interdepartmental with Neurology and Ophthalmology. P: EPI 810 or approval of department R: Open to graduate students in the Department of Epidemiology and Biostatistics or approval of department.
Epidemiology of neurologic and neuropsychiatric disorders with emphases on neurodegenerative disorders (e.g., Alzheimer’s disease).
Effective Spring 2015 Effective Fall 2017

EPI 860  Advanced Inference for Biostatistics
Fall of every year. 3(3-0) Interdepartmental with Statistics and Probability. P: STT 861 and STT 862 or approval of department RB: Masters in statistics or biostatistics R: Open to doctoral students in the Department of Epidemiology and Biostatistics or approval of department.
NEW
Statistical inference problems with biomedical applications; probability limit theorems; M-estimation and Z-estimation; likelihood-based tests; Pearson’s Chi-Square tests; nonparametric tests; confidence interval construction; Bootstrap; introduction to semiparametric inference; Applications of multiple linear regression, categorical data analysis, survival analysis, longitudinal data analysis in biostatistics.
Effective Spring 2018

EPI 977  Social Epidemiology
Fall of even years. Spring of even years. 3(3-0) Interdepartmental with Sociology. P: EPI 810 or approval of department RB: (LCS 829 or EPI 812) or equivalent R: Open to graduate students in the Department of Epidemiology and Biostatistics or approval of department.
Introduction to the field of social epidemiology and the social determinants of health.
Contemporary theoretical and methodological issues in social epidemiology.
Effective Fall 2015 Effective Fall 2017

HM 609  Laboratory Medicine Clerkship
Fall of every year. Spring of every year. Summer of every year. 1 to 8 credits. 3 to 6 credits.
Interdepartmental with Osteopathic Medicine. A student may earn a maximum of 16 credits in all enrollments for this course. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to graduate-professional students in College of Human Medicine or Osteopathic Medicine. R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.
Laboratory procedures. Correlation of laboratory data with morphologic abnormalities in patients with pathophysiology.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.
SA: PTH 609
Effective Summer 2004 Effective Summer 2018
HM 610  Pathology Clerkship
Fall of every year. Spring of every year. Summer of every year. 1 to 8 credits. 3 to 6 credits. Interdepartmental with Osteopathic Medicine. A student may earn a maximum of 12 credits in all enrollments for this course. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to graduate-professional students in College of Human Medicine or Osteopathic Medicine. R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.
Anatomic and clinical pathology with emphasis on clinical-pathological correlation. Conducted in pathology departments of affiliated hospitals.
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 4 semesters after the end of the semester of enrollment.
SA: PTH 608

Effective Summer 2004 Effective Summer 2018

HM 895  Clinical Medicine Capstone Experience
Fall of every year. Spring of every year. Summer of every year. 3 to 6 credits. P: HM 552 and HM 553 and HM 554 and HM 555 and HM 556 R: Open to students in the College of Human Medicine.
NEW Culmination of the Master of Arts in Clinical Medicine degree. Preparation and presentation of student’s capstone project.
Effective Fall 2017

PSC 611  Addiction Psychiatry 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. RB: HM 556 or PSC 608 R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.
NEW Advance knowledge and skills in psychopathology, psychiatric diagnosis, psychiatric therapies and prevention with addiction patient and their families.
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 2018

PSC 612  Geriatric Psychiatry 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. RB: HM 556 or PSC 608 R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.
NEW Advance knowledge and skills in psychopathology, psychiatric diagnosis, psychiatric therapies and prevention of psychiatric illness with geriatric patients and their families.
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 2018

ANTR 211  Human Tissues and Cells for Medical Illustrators
Spring of every year. Grand Rapids, Grand Rapids, Grand Rapids Grand Rapids 3(2-2) P: BS 161 or BS 181H R: Not open to students in the College of Natural Science. Approval of department.
Not open to students with credit in IBIO 408.
Elementary structure and function of human tissues, cells, and representative biomolecular classes. Virtual histology laboratory.

Effective Summer 2018 Effective Spring 2018
COLLEGE OF NATURAL SCIENCE

CMSE 202  Computational Modeling Tools and Techniques
Fall of every year. Spring of every year. 4(4-0) R: CMSE 201 or CSE 231 P: CMSE 201 R: Open to undergraduate students.
Continuation of introduction to computational modeling focusing on standard methods and tools used for modeling and data analysis. Topics may include statistical analysis, symbolic math, linear algebra, simulation techniques, data mining.
SA: NSC 205
Effective Fall 2016 Effective Fall 2018

CMSE 491  Selected Topics in Computational Mathematics, Science, and Engineering
Fall of every year. Spring of every year. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department. R: Open to students.
Topics selected to supplement and enrich existing courses and lead to the development of new courses.
Effective Fall 2016 Effective Fall 2018

IBIO 851  Statistical Methods for Ecology and Evolution
Fall of every year. 3(2-2) Interdepartmental with Plant Biology. RB: (STT 814) or an equivalent course.
Statistical modeling and interpretation of biological data using computationally intensive methods for estimation and inference. General linear models, mixed and process models, and estimation strategies applied to students using their own data using the R language.
SA: ZOL 851
DELETE COURSE
Effective Spring 2018

AST 301  Junior Research Seminar
Fall of every year. Spring of every year. 1(1-0) P: Completion of Tier I writing requirement.
Preparation and presentation of a review paper on a current topic in astronomy or astrophysics.
DELETE COURSE
Effective Spring 2018

AST 308  Galaxies and Cosmology
Fall of odd years. Spring of odd years. 3(3-0) P: AST 208 and ((PHY 215 or concurrently) or PHY 215B) and (PHY 321 or concurrently) P: (AST 208) and ((PHY 215 or concurrently) or PHY 215B) and (PHY 321 or concurrently)
SA: AST 402
Effective Fall 2013 Effective Fall 2018

PHY 431  Optics I
Fall of every year. Spring of every year. 3(2-3) P: (((PHY 184 or PHY 184B or PHY 294H) and PHY 192) or LB 274) and (((MTH 235 or concurrently) or (MTH 340 or concurrently) or (MTH 347H or concurrently)) and completion of Tier I writing requirement)
Lenses, aberrations, apertures, and stops. Diffraction, interferometry, spectroscopy, fiber optics.
Effective Spring 2017 Effective Fall 2018

PHY 831  Statistical Mechanics
Fall of every year. Spring of every year. 3(3-0) R: Open to graduate students or master's students.
Effective Fall 1993 Effective Fall 2018
PHY 861  Beam Physics  
**Fall of every year, Spring of odd years, Spring of every year, Summer of every year.** 3(3-0) RB: PHY 820 and PHY 841  
Particle accelerator theory and design. 
**Effective Spring 1995 Effective Summer 2018**

PHY 950  Data Analysis Methods for High-Energy and Nuclear Physics  
**Fall of every year, Fall of even years.** 2(2-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to graduate students in the Department of Physics and Astronomy or approval of department.  
Tools and methods used for analyzing data in large experiments. 
**Effective Fall 2014 Effective Fall 2018**

PHY 973  Special Topics in Condensed Matter Physics  
**Fall of every year, Spring of every year, On Demand.** 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: PHY 971 and PHY 972  
Topics vary and may include quantum optics, scattering methods and Green's functions. 
**Effective Fall 2003 Effective Spring 2018**