1. Request to change the award type of the Graduate Specialization in Environmental Toxicology to Graduate Certificate in Environmental Toxicology in the College of Agriculture and Natural Resources. The University Committee on Graduate Studies (UCGS) will consider this request at its April 6, 2015 meeting.

Students currently enrolled in the Specialization will continue to follow the requirements for the specialization that were in effect the term they were admitted to the specialization.

Students admitted to the Graduate Certificate Fall 2015 and forward will follow the requirements for the Graduate Certificate.

Effective Fall 2015.

2. Request to change the requirements for the Graduate Certificate in Environmental Toxicology in the College of Agriculture and Natural Resources. The University Committee on Graduate Studies (UCGS) will consider this request at its April 6, 2015 meeting.

a. Under the heading Requirements for the Graduate Certificate in Environmental Toxicology replace the entire entry with the following:

The student’s program of study must be approved by the student’s academic advisor for the certificate. The student must meet the requirements as specified below:

<table>
<thead>
<tr>
<th>C R E D I T S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have a grade-point average of at least 3.00 in the courses that are used to satisfy the requirements for the certificate.</td>
</tr>
<tr>
<td>2. Complete the following courses (6 credits):</td>
</tr>
<tr>
<td>CSUS 846 Law of Environmental Regulation</td>
</tr>
<tr>
<td>PHM 450 Introduction to Chemical Toxicology</td>
</tr>
<tr>
<td>3. Complete two courses from any of the five categories list below (6 to 8 credits):</td>
</tr>
<tr>
<td>Environmental Dynamics</td>
</tr>
<tr>
<td>CSS 455 Environmental Pollutants in Soil and Water</td>
</tr>
<tr>
<td>ENE 481 Environmental Chemistry: Equilibrium Concepts</td>
</tr>
<tr>
<td>ENE 801 Dynamics of Environmental Systems</td>
</tr>
<tr>
<td>ENE 821 Groundwater Hydraulics</td>
</tr>
<tr>
<td>GLG 421 Environmental Geochemistry</td>
</tr>
<tr>
<td>GLG 821 Aqueous Geochemistry</td>
</tr>
<tr>
<td>MMG 425 Microbial Ecology</td>
</tr>
<tr>
<td>ZOL 897 Ecosystem Ecology and Global Change</td>
</tr>
<tr>
<td>Economics, Policy, and Law</td>
</tr>
<tr>
<td>AFRE 810 Institutional Behavioral Economics</td>
</tr>
<tr>
<td>AFRE 829 Economics of Environmental Resources</td>
</tr>
<tr>
<td>CSUS 425 Environmental Impact Assessment</td>
</tr>
<tr>
<td>Waste Management</td>
</tr>
<tr>
<td>ENE 483 Water and Wastewater Treatment</td>
</tr>
<tr>
<td>ENE 487 Microbiology for Environmental Science and Engineering</td>
</tr>
<tr>
<td>ENE 804 Biological Processes in Environmental Engineering</td>
</tr>
<tr>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>CEM 835 Advanced Analytical Chemistry II</td>
</tr>
<tr>
<td>CEM 836 Separation Science</td>
</tr>
<tr>
<td>CEM 845 Structure and Spectroscopy of Organic Compounds</td>
</tr>
<tr>
<td>Mechanisms of Toxicity</td>
</tr>
<tr>
<td>ANS 407 Food and Animal Toxicology</td>
</tr>
<tr>
<td>BMB 960 Selected Topics in Biochemistry I</td>
</tr>
<tr>
<td>FSC 807 Advanced Food Toxicology</td>
</tr>
</tbody>
</table>

Biochemistry and Molecular Biology 960 may be counted toward the requirements for the certificate only when the topic deals with environmental toxicology.
4. Attend a minimum of six seminars in environmental toxicology.

Effective Fall 2015.

3. Request to establish a **Graduate Certificate** in **Spatial Ecology** in the Department of Forestry. The University Committee on Graduate Studies (UCGS) approved this request at its March 9, 2015 meeting.

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

a. **Background Information:**

Spatial ecology is concerned with the identification of spatial patterns and their relationships to ecological phenomena. Interests in: 1) broad-scale natural resource assessments, 2) management and integration of “big data” into problem solving and decision-making, and 3) the use of technology to collect massive amounts of spatially and temporally explicit data have precipitated increased interest in spatial ecology. Historically, graduate students interested in spatial topics would seek training in departments like Geography, whereas those interested in ecology would seek training in departments like Fisheries and Wildlife or Forestry. Graduate student interests in the integrated aspects of spatial ecology have increased and, given current and future course offerings at MSU, MSU is well-poised to offer our students a transcriptable certificate in spatial ecology.

A Google search indicates that this type of certificate is not commonly offered at other universities in the United States. Offering a graduate certificate in spatial ecology will position MSU as a leader in providing this training. Several of the core courses are generally well subscribed. Graduate students have repeatedly indicated that some type of transcriptable training in spatial ecology is highly desirable and, for some students, would potentially provide a competitive edge in the job market.

No national or international standards or accreditation bodies exist for this sort of program. At other universities these skills appear to be acquired by students from whatever courses are offered. Despite the lack of formal standards or academic programs, there is considerable demand for professionals with this multidisciplinary skillset across a diverse range of academic and non-academic settings. In late summer 2014, an informal search of open positions on the Monster.com and simplyhired.com job Web sites requesting these skills from applicants with advanced degrees revealed opportunities at more than twenty organizations.

MSU is uniquely positioned to offer this program because of the relatively large number of faculty engaged in spatial ecology. In particular, a sufficient variety of topical courses are already being offered across campus.

b. **Academic Programs Catalog Text:**

The Graduate Certificate in Spatial Ecology provides interdisciplinary training necessary to develop inference about ecological phenomena using appropriate spatial theory, statistics, modeling approaches, and data management tools. Students gain the necessary skills to address tomorrow’s complex ecological challenges.

The graduate certificate is available as an elective to students who are enrolled in master’s or doctoral degree programs at Michigan State University.

**Requirements for the Graduate Certificate in Spatial Ecology**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The following course (4 credits):</td>
<td></td>
</tr>
<tr>
<td>GEO 866 Spatial Data</td>
<td>4</td>
</tr>
<tr>
<td>2. One of the following courses (3 credits):</td>
<td></td>
</tr>
<tr>
<td>FOR 870 Spatial Ecology</td>
<td>3</td>
</tr>
<tr>
<td>FW 840 Landscape Ecology</td>
<td>3</td>
</tr>
</tbody>
</table>
3. One of the following courses (3 or 4 credits):
   CSS 921 Geostatistics 3
   FOR 867 Hierarchical Modeling and Computing for Spatio-temporal Environmental Data 3
   FOR 870 Spatial Ecology 3
   FW 840 Landscape Ecology 3
   GEO 865 Advanced Quantitative Methods in Geography 4
   GEO 869 Geosimulation 3
Forestry 870 and Fisheries and Wildlife 840 may not be used to fulfill this requirement if used to fulfill requirement 2. above.

Effective Fall 2015.

COLLEGE OF ENGINEERING

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

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

      (1) In item 3. a. (1) delete the following course and the note following the list of courses:

            BS 171 Cell and Molecular Biology Laboratory 2

      (2) In item 3. a. (2) delete the following course:

            BS 161 Cell and Molecular Biology 3

      (3) In item 3. b. make the following changes:

            (a) Change the total credits from ’32’ to ’33’.

            (b) Change the credits of CSE 335 from ’3’ to ’4’.

      (4) In item 3. c. add the following course and delete the note following the list of courses:

            MTH 451 Numerical Analysis I 3

Effective Fall 2015.

2. Request to change the requirements in the Minor in Computer Science in the Department of Computer Science and Engineering.

   a. Under the heading Requirements for the Minor in Computer Science make the following changes:

      (5) Change item 2. to ’Two of the following courses (6 or 7 credits):’ and change the credits of CSE 335 from ’3’ to ’4’.

      (6) In item 3. collapse the courses into item 2. and make the following changes:

            (a) Delete the following courses:

                CSE 452 Organization of Programming Languages 3
                CSE 475 Introduction to Computational Linguistics 3
Add the following courses:

CSE 473 Fundamentals of 3D Game Development  3
CSE 476 Mobile Application Development   3
CSE 477 Web Application Architecture and Development  3

Effective Fall 2015.

COLLEGE OF NURSING

1. Request to change the requirements for the Doctor of Philosophy degree in Nursing. The University Committee on Graduate Studies (UCGS) will consider this request at its April 6, 2015 meeting.

a. Under the heading Admission make the following changes:

(1) Change item 1) to the following:
A minimum cumulative grade-point average of at least 3.0 for all previous academic work.

(2) Change item 2) to the following:
Competitive scores on the Graduate Record Examination Verbal, Quantitative, and Analytic sections completed within last five years.

(3) Change item 3) to the following:
Bachelor’s and master’s degree in nursing. Admission to the program with a master’s degree in nursing may require additional course work as specified by the College of Nursing.

(4) Change item 4) to the following:
Three letters of recommendation on official letterhead stationery from academic or employment sources that are knowledgeable about your potential for doctoral study and research in nursing.

(5) Add the following paragraph:
Students who do not meet the requirements for regular admission to the Doctor of Philosophy degree in Nursing program may be accepted provisionally. Provisionally admitted students are required to satisfy deficiencies as specified in the letter of admission and will be formally removed from provisional status once the deficiencies are satisfied. Students on provisional status may not progress in the program if deficiencies are not satisfied in the specified time frame. Provisional course work does not count towards fulfillment of degree requirements.

b. Under the heading Requirements for the Doctor of Philosophy Degree in Nursing make the following changes:

(1) Delete item 3.

(2) Renumber item 4. to item 3. and change the credits from ‘6’ to ‘9’.

Effective Fall 2015.
2. Request to change the requirements for the **Doctor of Nursing Practice** degree in **Nursing Practice**. The University Committee on Graduate Studies (UCGS) will consider this request at its April 6, 2015 meeting.

   a. Under the heading **Admission** make the following change:

   Add the following paragraph:

   Students who do not meet the requirements for regular admission to the Doctor of Nursing Practice degree in Nursing Practice program may be accepted provisionally. Provisionally admitted students are required to satisfy deficiencies as specified in the letter of admission and will be formally removed from provisional status once the deficiencies are satisfied. Students on provisional status may not progress in the program if deficiencies are not satisfied in the specified time frame. Provisional course work does not count towards fulfillment of degree requirements.

Effective Fall 2015.

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**COLLEGE OF VETERINARY MEDICINE**

1. Request to change the requirements for the **Master of Science** degree in **Food Safety** in the College of Veterinary Medicine. The University Committee on Graduate Studies (UCGS) will consider this request at its April 6, 2015 meeting.

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

   Applicants will be accepted after review by an admissions committee of faculty. An academic specialist will serve as the student’s academic advisor and will assist the student in planning a program of study that is related to the student’s interests and professional goals and that fulfills college and university requirements.

   Applicants must have completed a bachelor’s degree from an accredited and recognized college or university with a cumulative grade-point average of 3.0 on a 4.0 scale. The applicant must have completed at least 6 credits of college-level course work in biological sciences, including 3 credits in microbiology. A 300-level course or higher is recommended. The applicant must prove or demonstrate proficiency in written and spoken English and submit a personal statement and three letters of recommendation. Experience in the workplace is weighed heavily in meeting requirements for admission.

   Applicants who do not meet all of the requirements listed above may be admitted provisionally and permitted to enroll for collateral course work, not to count toward the degree. This course work must be approved beforehand by the program director.

   b. **Under the heading Requirements for the Master of Science Degree in Food Safety** make the following changes:

   (1) In item 1. delete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANR 810</td>
<td>International Food Laws and Regulations</td>
<td>3</td>
</tr>
<tr>
<td>ANR 811</td>
<td>U.S. Food Laws and Regulations</td>
<td>3</td>
</tr>
</tbody>
</table>

   Add the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSC 810</td>
<td>International Food Laws and Regulations</td>
<td>3</td>
</tr>
<tr>
<td>FSC 811</td>
<td>U.S. Food Laws and Regulations</td>
<td>3</td>
</tr>
</tbody>
</table>

   (2) In item 2. delete the following course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCS 830</td>
<td>Epidemiologic Foodborne Diseases and Food Safety: An Overview</td>
<td>3</td>
</tr>
</tbody>
</table>

   Add the following course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 831</td>
<td>Foodborne Disease Epidemiology for the Professional</td>
<td>3</td>
</tr>
</tbody>
</table>
(3) Replace item 4. with the following:

Pass a final applied project.

Effective Summer 2015.
PART II - NEW COURSES AND CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

FOR 870  Spatial Ecology
Fall of every year. 3(2-2) Interdepartmental with Fisheries and Wildlife. RB: (ZOL 851 or concurrently) or Equivalent
NEW  "Science of understanding and predicting ecological patterns in space."
Effective Fall 2015

COLLEGE OF ENGINEERING

CSE 410  Operating Systems
Fall of every year. Spring of every year. 3(3-0) P: (CSE 232 and CSE 260) and (CSE 320 or ECE 331) R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 410
Effective Spring 2014 Effective Fall 2015

CSE 420  Computer Architecture
Fall of every year. Spring of every year. 3(3-0) P: (CSE 232 and CSE 260) and (CSE 320 or ECE 331) R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 420
Effective Spring 2014 Effective Fall 2015

CSE 422  Computer Networks
Fall of every year. Spring of every year. 3(3-0) P: (STT 351 or ECE 280) and (CSE 410 or concurrently) R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 422
Effective Spring 2014 Effective Fall 2015
CSE 425  Introduction to Computer Security
Spring of every year. 3(3-0) P: CSE 422 or concurrently R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.

Effective Spring 2014 Effective Fall 2015

CSE 435  Software Engineering
Fall of every year. 3(3-0) P: (CSE 331 and CSE 335) and completion of Tier I writing requirement R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
Software lifecycle including specification, design, coding, testing, and verification of a software product. Stepwise refinement and traceability. Software maintenance and documentation.
SA: CSE 470

Effective Spring 2014 Effective Fall 2015

CSE 440  Introduction to Artificial Intelligence
Fall of every year. 3(3-0) P: CSE 331 R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 440

Effective Spring 2014 Effective Fall 2015

CSE 450  Translation of Programming Languages
Spring of every year. 3(3-0) P: CSE 331 and (CSE 320 or ECE 331) R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 450

Effective Spring 2014 Effective Fall 2015
CSE 460  Computability and Formal Language Theory
Fall of every year. Spring of every year. 3(3-0) P: CSE 331  R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.  R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
Formal models of computation such as finite state automata, pushdown automata and Turing machines. Formal definitions of languages, problems, and language classes including recursive, recursively enumerable, regular, and context free languages. The relationships among various models of computation, language classes, and problems. Church's thesis and the limits of computability. Proofs of program properties including correctness.
SA: CSE 360
Effective Spring 2014 Effective Fall 2015

CSE 471  Media Processing and Multimedia Computing
Fall of every year. 3(3-0) P: CSE 320 or CSE 331 or CSE 335  R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.  R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
Effective Spring 2014 Effective Fall 2015

CSE 472  Computer Graphics
Spring of every year. 3(3-0) P: CSE 331 or CSE 335  R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.  R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
SA: CPS 472
Effective Spring 2014 Effective Fall 2015

CSE 473  Fundamentals of 3D Game Development
Fall of every year. 3(3-0) P: CSE 331 or CSE 335  R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.  R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
Fundamental algorithms and techniques for 3D computer game development including geometric transformations, procedural and keyframe animation, models and scene graphs, skeletal animation and skinned characters, illuminations and shading, collision detection, and level of detail.
Effective Spring 2014 Effective Fall 2015
CSE 476  Mobile Application Development  
Spring of every year. 3(3-0) P: CSE 320 or CSE 331 or CSE 335 R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.

- Software development techniques for mobile devices such as smart phones and tablet computers. 
- Effective Fall 2014 Effective Fall 2015

CSE 477  Web Application Architecture and Development  
Spring of every year. 3(3-0) P: CSE 331 R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.

- Fundamentals of World Wide Web (WWW) programming, including protocols, client-server interaction, markup languages, client- and server-side programming, databases, and remote procedure calls. Development of a WWW server and WWW sites with browser-based interfaces to remote databases. Students will incorporate scaling, throughput, and latency considerations in the development of widely-distributed systems. 
- Effective Fall 2014 Effective Fall 2015

CSE 480  Database Systems  
Spring of every year. 3(3-0) P: CSE 331 R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.

- Storage of and access to physical databases including indexing, hashing, and range accesses. Relational data models, database design principles, query languages, query optimization, transaction processing and recovery techniques. Object-oriented and distributed databases. 
- SA: CPS 480
- Effective Spring 2014 Effective Fall 2015

CSE 484  Information Retrieval  
Fall of every year. 3(3-0) P: CSE 331 RB: STT 351 R: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. R: Open to students in the Computer Engineering Major or in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.

- Effective Spring 2014 Effective Fall 2015
CSE 490  Independent Study in Computer Science
Fall of every year. Spring of every year. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. **R**: Open to students in the College of Engineering or in the Computer Engineering Major. Approval of department; application required. **R**: Open to students in the Computer Engineering Major or in the Computer Science Major. Approval of department; application required.
Supervised individual study in an area of computer science.
SA: CPS 490
Effective Spring 2014 Effective Fall 2015

CSE 491  Selected Topics in Computer Science
Fall of every year. Spring of every year. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. **R**: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. Approval of department. **R**: Open to students in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor.
Topics selected to supplement and enrich existing courses and lead to the development of new courses.
SA: CPS 491
Effective Fall 2014 Effective Fall 2015

CSE 498  Collaborative Design (W)
Fall of every year. Spring of every year. 4(2-4) P: {(CSE 420 or CSE 422 or CSE 425 or CSE 435 or CSE 440 or CSE 450) or (CSE 460 or CSE 471 or CSE 472 or CSE 473 or CSE 480 or CSE 484}) and ((CSE 335 and CSE 410) and completion of Tier I writing requirement) **R**: Open to students in the Department of Computer Science and Engineering or in the Computer Engineering Major or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Computer Science Disciplinary Teaching Minor. **R**: Open to students in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major.
Development of a comprehensive software and/or hardware solution to a problem in a team setting with emphasis on working with a client. Participation in a design cycle including specification, design, implementation, testing, maintenance, and documentation. Issues of professionalism, ethics, and communication.
SA: CSE 449, CSE 478, CSE 479
Effective Spring 2014 Effective Fall 2015

COLLEGE OF HUMAN MEDICINE

ANTR 350  Human Gross Anatomy for Pre-Health Professionals
Fall of every year. Spring of every year. Summer of every year. 3(4-0) P: BS 161 or BS 181H or LB 145 R: Not open to freshmen or approval of department.
PCR Survey of human systemic gross anatomy with clinical illustrations. Structural basis of organ system physiology. Introduction to medical terminology and clinical language.
Effective Summer 2013 Effective Summer 2015

COLLEGE OF NATURAL SCIENCE

BLD 805  Communication in the Sciences
Fall of every year. Summer of every year. 2(2-0)
NEW This course prepares students for professional communication in clinical laboratory science, including article and proposal writing, thesis writing, posters, and presentations. Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 3 semesters after the end of the semester of enrollment.
Effective Summer 2015
BLD 861  Emerging Infections, Emerging Technology  
Summer of every year. 2(2-0) P: MMG 463 or approval of department RB: Undergraduate degree in medical laboratory science, microbiology or epidemiology  
NEW This course uses recent cases in infectious diseases to investigate the causes for disease emergence and the laboratory technologies used to identify the microbial causes, to describe epidemiology and to develop surveillance systems and prevention. Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 3 semesters after the end of the semester of enrollment.  
Effective Summer 2015

BLD 871  Applied Clinical Mass Spectrometry  
Spring of every year. 2(2-0) P: BLD 870 or approval of department RB: One course in protein chemistry or concurrent R: Open to graduate students.  
NEW Data interpretation and quality control in clinical mass spectrometry. Principles of sample preparation, platform selection, data analysis, and clinical applications as it applies to the clinical laboratory. Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 3 semesters after the end of the semester of enrollment.  
Effective Summer 2015

NSC 204  Introduction to Computational Science  
Spring of every year. 4(4-0) P: MTH 124 or MTH 132 or MTH 152H or LB 118  
NEW Basics of computational science using a wide variety of applications examples. Algorithmic thinking and model building, programming fundamentals, data visualization, numerical methods. Effective Spring 2016

NSC 205  Computational Science Tools and Techniques  
Fall of every year. 4(4-0) P: NSC 204  
NEW Continuation of introduction to computational science 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. Effective Fall 2016

ZOL 357  Global Change Biology (W)  
Spring of every year. 3(3-0) P: (ZOL 355) and completion of Tier I writing requirement RB: Intended for science or engineering majors R: Not open to freshmen.  
NEW Causes and consequences of modes of contemporary global change that are caused by biological systems or impact biological systems. Theories, evidence, predictions. Global warming, ocean acidification, desertification, eutrophication, food security, mass extinction. Effective Spring 2016

PHM 440  Principles of Drug Action  
Summer of every year. 1 credit. RB: Chemistry, molecular biology, biochemistry, physiology, and/or human biology. R: Open to masters students in the Integrative Pharmacology major or in the Pharmacology and Toxicology major. R: Not open to masters students in the the Integrative Pharmacology Major or in the Pharmacology and Toxicology Major. Not open to students with credit in PHM 430 or PHM 350. Factors influencing drug action. Absorption, distribution, and elimination. Factors controlling intensity, selectivity and nature of drug action. Mismatches of drug presence and drug action including receptor-effector coupling mechanisms and mechanisms of drug tolerance. Offered first half of semester. Effective Spring 2014 Effective Summer 2015

COLLEGE OF VETERINARY MEDICINE

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