PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF ENGINEERING

1. Request to change the requirements for the Doctor of Philosophy degree in Biomedical Engineering in the College of Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its October 12, 2020 meeting.

   a. Under the heading Requirements for the Doctor of Philosophy Degree in Biomedical Engineering make the following changes:

      (1) In item 1., add the following course:

          BME 840 BioDesignIQ 3

      (2) Renumber items 2. and 3. to items 4. and 5. respectively.

      (3) Add the following items 2. and 3.:

          2. Complete at least 12 credits in thematic elective courses at the 800-level or above. Must include an engineering science course, a life science course, a mathematics/statistics/computational course, and another elective course chosen from a list of approved courses maintained by the department.

          3. Successful completion of the written and oral portions of the comprehensive examination by the end of the 4th semester in the program.

   Effective Fall 2021.

2. Request to change the requirements in the Bachelor of Science degree in Civil Engineering in the Department of Civil and Environmental Engineering.

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

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

          CE 372 Risk Analysis in Civil and Environmental Engineering 2

          Add the following courses:

          CE 275 GIS for Civil and Environmental Engineers 1
          CE 372 Risk Analysis in Civil and Environmental Engineering 3

      (2) In item 3. e. Geotechnical add the following course:

          CE 485 Landfill Design 3

      (3) In item 3. f. add the following courses:

          CE 473 Smart and Sustainable Building Design and Operations 3
          ENE 472 Life Cycle Assessment of Energy Technologies 3

   Effective Fall 2021.
3. Request to change the requirements in the Bachelor of Science degree in Environmental Engineering in the Department of Civil and Environmental Engineering.

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

(1) In item 3. a. change the total credits from ‘52’ to ‘53’ and add the following courses:

- CE 275 GIS for Civil and Environmental Engineers 1
- CE 372 Risk Analysis in Civil and Environmental Engineering 3
- ENE 480 Environmental Measurements Laboratory 2

Delete the following courses:

- CE 273 Civil and Environmental Engineering Measurements 2
- CE 372 Risk Analysis in Civil and Environmental Engineering 2
- ENE 480 Environmental Measurements Laboratory 1

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

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

**Engineering Electives.** Complete at least one course for a minimum of 3 credits of electives from the list below or by approval of the department. Students must contact the department for approval.

- BE 449 Human, Health Risk Analysis for Engineering Controls 3
- BE 469 Sustainable Bioenergy Systems 3
- BE 482 Engineering Ecological Treatment Systems 3
- BE 484 Water Resource Recovery Engineering 3
- CE 473 Smart and Sustainable Building Design and Operations 3
- CE 485 Landfill Design 3
- ENE 472 Life Cycle Assessment of Energy Technologies 3

(4) In item 3. f., change the requirement to the following:

Complete at least two courses for a minimum of 6 credits of electives from the list below, list above (e.), or by approval of the department. Students may substitute a 3-credit experiential education experience for one of the three courses. The experience is obtained in a minimum of three out-of-classroom experiences through engineering cooperative education. Students must contact the department for approval.

(5) In item 3. f. delete the following courses:

- CSUS 425 Environmental Impact Assessment 3
- FW 443 Restoration Ecology 3
- GLG 412 Glacial Geology and the Record of Climate Change 3
- IBIO 303 Oceanography 4

Add the following courses:

- GLG 303 Oceanography 4
- GLG 412 Glacial Geology and the Record of Climate Change 4
- PLB 443 Restoration Ecology 3

Effective Fall 2021.
4. Request to change the requirements in the Doctor of Philosophy degree in Civil Engineering in the Department of Civil and Environmental Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its October 12, 2020 meeting.

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

   An applicant for admission to the Ph.D. degree program in civil engineering should have a bachelor's or master's degree in civil engineering or a related field and should have a grade-point average that would indicate success in graduate study.

   All applicants are encouraged to submit their scores from the Graduate Record Examination General Test.

   In addition to meeting the requirements of the university and of the College of Engineering, students must meet the requirements specified by their guidance committees.

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

   These general criteria are the same for all students, the specific requirements for each student are developed in consultation with the advisor and the guidance committee.

   1. Students with a Master of Science degree in Civil Engineering must complete 12 credits of coursework at the 800-level or above in consultation with their advisor and guidance committee.

   2. Students admitted directly to the Doctor of Philosophy degree in Civil Engineering must also complete the requirements for the Master of Science degree in Civil Engineering as part of the doctoral plan of study.

   3. Students entering the program with a bachelor's or master's degree in a field other than civil engineering may be required to complete additional collateral course work to fulfill deficiencies in their academic background as specified by the guidance committee. This course work will not count towards the requirements for the doctoral degree program.

   4. Complete the following course during the first year of study:

   CE 900 Research Strategies and Methods in Civil Engineering 1

   5. Complete 24 to 36 credits of CE 999 Doctoral Dissertation Research.

   6. Complete a qualifying examination comprised of a written examination and an oral examination.

   7. Complete a comprehensive examination comprised of a written thesis proposal and oral presentation. This examination must be completed at least six months prior to the doctoral dissertation defense.

   8. Complete and successfully defend the dissertation and present the results of the dissertation research in a public seminar.

   Effective Fall 2021.

5. Request to change the requirements in the Doctor of Philosophy degree in Environmental Engineering in the Department of Civil and Environmental Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its October 12, 2020 meeting.

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

   An applicant for admission to the Ph.D. degree program in environmental engineering should have a bachelor's or master's degree in environmental engineering or a related field and should have a grade-point average that would indicate success in graduate study.

   All applicants are encouraged to submit their scores from the Graduate Record Examination General Test.

   In addition to meeting the requirements of the university and of the College of Engineering, students must meet the requirements specified by their guidance committees.

   b. Under the heading Requirements for the Doctor of Philosophy Degree in Environmental Engineering replace the entire entry with the following:
These general criteria are the same for all students, the specific requirements for each student are developed in consultation with the advisor and the guidance committee.

1. Students with a Master of Science degree in Environmental Engineering must complete 15 credits of coursework at the 800-level or above in consultation with their advisor and guidance committee.

2. Students admitted directly to the Doctor of Philosophy degree in Environmental Engineering must also complete the requirements for the Master of Science degree in Environmental Engineering as part of the doctoral plan of study.

3. Students entering the program with a bachelor's or master's degree in a field other than environmental engineering may be required to complete additional collateral course work to fulfill deficiencies in their academic background as specified by the guidance committee. This course work will not count towards the requirements for the doctoral degree program.

4. Complete the following course during the first year of study:
   ENE 900 Research Strategies and Methods in Environmental Engineering and Science


6. Complete a qualifying examination comprised of a written examination and an oral examination.

7. Complete a comprehensive examination comprised of a written thesis proposal and oral presentation. This examination must be completed at least six months prior to the doctoral dissertation defense.

8. Complete and successfully defend the dissertation and present the results of the dissertation research in a public seminar.

Effective Fall 2021.

**COLLEGE OF HUMAN MEDICINE**

1. Request to change the requirements for the Master of Science degree in Biostatistics in the Department of Epidemiology and Biostatistics. The University Committee on Graduate Studies (UCGS) will review this request at its October 12, 2020 meeting.

   a. Under the heading Requirements for the Master of Science degree in Biostatistics replace the entire entry with the following:

      The program is available under either Plan A (with thesis) or Plan B (without thesis). A total of 40 credits is required for both Plan A or Plan B, with no more than 6 credits at the 400-level. The student's program of study must be approved by the student's academic advisor and guidance committee with the approval of the Dean of the College of Human Medicine.

      In addition to meeting the requirements of the university and of the College of Human Medicine, the student must meet the following:

      | COURSE | CREDITS |
      |--------|---------|
      | EPI 808B Advanced Biostatistics | 3 |
      | EPI 810 Introductory Epidemiology | 3 |
      | EPI 826B Categorical Data Analysis | 3 |
      | EPI 828 Seminar in Responsible Conduct of Research | 1 |
      | EPI 855 Biostatistical Modeling in Genomic Data Analysis | 3 |
      | EPI 856 Statistical Consulting in Public Health | 1 |
      | LCS 829 Design and Conduct of Epidemiological Studies and Clinical Trials | 3 |

   2. Complete one of the following courses (3 credits):
      EPI 853B Statistical Computing
      STT 461 Computations in Probability and Statistics

   3. Complete 13 additional credits in biostatistics electives from the following:
      CEP 982 Seminar in Counseling Educational Psychology and Special Education
      EPI 851 SAS Programming I: Essentials
EPI 852 SAS Programming II: Data Management and Analysis 1
EPI 858 Clinical Trials 3
EPI 880 Select Topics in Biostatistics 3
EPI 890 Independent Study in Epidemiology and Biostatistics 1 to 3
EPI 920 Advanced Methods in Epidemiology and Applied Statistics 3
EPI 950 Advanced Biostatistical Methods in Epidemiology 3
EPI 952 Duration and Severity Analysis 3
EPI 953 Analytical Strategies for Observational Studies 3
STT 801 Design of Experiments 3
STT 825 Sample Surveys 3
STT 847 Analysis of Survival Data 3
STT 861 Theory of Probability and Statistics I 3

Additional elective courses may be chosen with advisor approval.

4. Complete 3 additional credits of epidemiology electives from the following:
   EPI 805 Readings in the Historical Roots of Epidemiological Thought 3
   EPI 812 Causal Inference in Epidemiology 3
   EPI 815 Epidemiology of Cardiovascular Disease 3
   EPI 816 Perinatal Epidemiology 3
   EPI 817 Epidemiology of Communicable Diseases 3
   EPI 823 Cancer Epidemiology 3
   EPI 835 Neuroepidemiology 3
   EPI 890 Independent Study in Epidemiology and Biostatistics 1 to 3
   EPI 891 Theories in Contemporary Epidemiology 3
   EPI 897 Social Epidemiology 3
   EPI 979 Advanced Topics of Infectious Disease Epidemiology 3

5. Attend all MSU Graduate School Responsible Conduct of Research (RCR) Workshops (Human).

Additional Requirements for Plan A
1. The following course (4 credits):
   EPI 899 Master's Thesis Research 4

Additional Requirements for Plan B
1. Complete 3 credits of additional elective course work, in addition to the elective requirements above, from a list of approved courses available on the Epidemiology and Biostatistics department Web site.
2. Complete a capstone project through enrollment in 1 credit of EPI 890 Independent Study in Epidemiology and Biostatistics.
3. Pass a final oral examination or evaluation of the capstone project.

Effective Fall 2021.

2. Request to change the requirements for the Doctor of Philosophy degree in Biostatistics in the Department of Epidemiology and Biostatistics. The University Committee on Graduate Studies (UCGS) will consider this request at its October 12, 2020 meeting.

   a. Under the heading Admission, in the second paragraph, change ‘the first 30 credits’ to ‘the first 40 credits’.

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

      The doctoral degree program offers three concentration areas: design and analysis of medical studies; big data and statistical genetics; ad biometry, a flexible option for students with diverse interests. The concentration is selected in consultation with a faculty advisor and guidance committee.

CREDITS

Students must:
1. Complete all of the following courses (13 credits):
   - EPI 810 Introductory Epidemiology 3
   - EPI 828 Seminar in Responsible Conduct of Research 1
   - EPI 860 Advanced Inference for Biostatistics 3
   - STT 867 Linear Model Methodology 3
   - STT 868 Mixed Models: Theory, Methods and Applications 3

2. Complete one of the following concentrations:

   **Design and Analysis of Medical Studies**
   1. One of the following courses (3 credits):
      - EPI 858 Clinical Trial I 3
      - EPI 952 Duration and Severity Analysis 3
      - STT 847 Analysis of Survival Data 3
   2. Complete 11 credits of elective course work:
      - ANS 814 Advanced Statistics for Biologists 4
      - CSE 331 Algorithms and Data Structures 3
      - CSE 480 Database Systems 3
      - CSE 482 Big Data Analysis 3
      - CSE 847 Machine Learning 3
      - CSE 881 Data Mining 3
      - EC 821A Cross Section and Panel Data Econometrics I 3
      - EC 821 Cross Section and Panel Data Econometrics II 3
      - EPI 812 Causal Inference in Epidemiology 3
      - EPI 855 Biostatistical Modeling in Genomic Data Analysis 3
      - EPI 880 Selected Topics in Biostatistics 3
      - EPI 920 Advanced Methods in Epidemiology and Applied Statistics 3
      - EPI 950 Advanced Biostatistical Methods in Epidemiology 3
      - EPI 952 Duration and Severity Analysis 3
      - EPI 953 Analytical Strategies for Observational Studies 3
      - EPI 990 Independent Study 3
      - STT 801 Design of Experiments 3
      - STT 825 Sample Surveys 3
      - STT 855 Statistical Genetics 3
      - STT 861 Theory of Probability and Statistics I 3
      - STT 862 Theory of Probability and Statistics II 3
      - STT 873 Statistical Learning and Data Mining 3
      - STT 874 Introduction to Bayesian Analysis 3

   Additional courses may be chosen with advisor approval.

   **Big Data and Statistical Genetics**
   1. One of the following courses:
      - EPI 855 Biostatistical Modeling in Genomic Data Analysis 3
      - STT 855 Statistical Genetics 3
      - CSE 231 Introduction to Programming I 3
      - CSE 232 Introduction to Programming II 4
      - STT 456 Actuarial Models II 3
   2. Complete 11 credits of elective course work:
      - ANS 814 Advanced Statistics for Biologists 4
      - CSE 331 Algorithms and Data Structures 3
      - CSE 480 Database Systems 3
      - CSE 482 Big Data Analysis 3
      - CSE 847 Machine Learning 3
      - CSE 881 Data Mining 3
      - EC 821A Cross Section and Panel Data Econometrics I 3
      - EC 821 Cross Section and Panel Data Econometrics II 3
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EPI 812 Causal Inference in Epidemiology 3
EPI 858 Clinical Trials 3
EPI 880 Selected Topics in Biostatistics 3
EPI 920 Advanced Methods in Epidemiology and Applied Statistics 3
EPI 950 Advanced Biostatistical Methods in Epidemiology 3
EPI 952 Duration and Severity Analysis 3
EPI 953 Analytical Strategies for Observational Studies 3
EPI 990 Independent Study 3
STT 801 Design of Experiments 3
STT 825 Sample Surveys 3
STT 861 Theory of Probability and Statistics I 3
STT 862 Theory of Probability and Statistics II 3
STT 873 Statistical Learning and Data Mining 3
STT 874 Introduction to Bayesian Analysis 3

Additional courses may be chosen with advisor approval.

Biometry
1. Complete 14 credits of elective course work:
   ANS 814 Advanced Statistics for Biologists 4
   CSE 331 Algorithms and Data Structures 3
   CSE 480 Database Systems 3
   CSE 482 Big Data Analysis 3
   CSE 847 Machine Learning 3
   CSE 881 Data Mining 3
   EC 821A Cross Section and Panel Data Econometrics I 3
   EC 821 Cross Section and Panel Data Econometrics II 3
   EPI 812 Causal Inference in Epidemiology 3
   EPI 855 Biostatistical Modeling in Genomic Data Analysis 3
   EPI 858 Clinical Trials 3
   EPI 880 Selected Topics in Biostatistics 3
   EPI 920 Advanced Methods in Epidemiology and Applied Statistics 3
   EPI 950 Advanced Biostatistical Methods in Epidemiology 3
   EPI 952 Duration and Severity Analysis 3
   EPI 953 Analytical Strategies for Observational Studies 3
   EPI 990 Independent Study 3
   STT 801 Design of Experiments 3
   STT 825 Sample Surveys 3
   STT 847 Survival Analysis 3
   STT 855 Statistical Genetics 3
   STT 861 Theory of Probability and Statistics I 3
   STT 862 Theory of Probability and Statistics II 3
   STT 873 Statistical Learning and Data Mining 3
   STT 874 Introduction to Bayesian Analysis 3

Additional courses may be chosen with advisor approval.

2. Attend all MSU Graduate School Responsible Conduct of Research (RCR) Workshops (human).
3. Attend 80% of department-sponsored Seminars.
4. Attend 80% of department Ph.D. Journal Club meetings.
5. Present at one Ph.D. Journal Club meeting.
6. Pass a comprehensive examination.
Academic Standards

Students will sit for a comprehensive examination after the necessary course work is completed, typically at the end of the first year of study. A student who fails the comprehensive examination may repeat it only once. A retake examination will generally be given in January.

Effective Fall 2021.

3. Request to change the requirements for the Master of Science degree in Epidemiology in the Department of Epidemiology and Biostatistics. The University Committee on Graduate Studies (UCGS) will review this request at its October 12, 2020 meeting.

a. Under the heading Requirements for the Master of Science degree in Biostatistics make the following changes:

   (1) Change the entry paragraph to the following:

   Students must complete 40 credits, with no more than 6 credits at the 400-level.

   (2) Replace items 3. and 4. with the following:

   3. An additional 6 credits of elective course work from the following list of approved courses:

       EPI 805 Readings in the Historical Roots of Epidemiological Thought 3
       EPI 815 Epidemiology of Cardiovascular Disease 3
       EPI 816 Perinatal Epidemiology 3
       EPI 823 Cancer Epidemiology 3
       EPI 835 Neuroepidemiology 3
       EPI 890 Independent Study in Epidemiology and Biostatistics 1 to 3
       EPI 910 Themes in Contemporary Epidemiology 3
       EPI 920 Advanced Methods in Epidemiology and Applied Statistics 3
       EPI 950 Advanced Biostatistical Methods in Epidemiology 3
       EPI 952 Duration and Severity Analysis 3
       EPI 953 Analytical Strategies for Observational Studies 3
       EPI 977 Social Epidemiology 3
       EPI 979 Advanced Topics of Infectious Disease Epidemiology 3
       STT 847 Analysis of Survival Data 3

       Additional elective courses may be chosen with advisor approval.

   4. Attend all MSU Graduate School Responsible Conduct of Research (RCR) Workshops (Human).

   5. Pass an oral examination in defense of the thesis.

Effective Fall 2021.

LYMAN BRIGGS COLLEGE

1. Request to change the requirements for the Computer Science major leading to the Bachelor of Science Degree in Lyman Briggs College.

a. Under the heading Requirements for Bachelor of Science Degree in Lyman Briggs College replace item 2. Computer Science with the following:

   A minimum of 37 credits from the following courses:

   (1) All of the following courses (28 credits):

       CSE 231 Introduction to Programming I 4
       CSE 232 Introduction to Programming II 4
       CSE 260 Discrete Structures in Computer Science 4
       CSE 320 Computer Organization and Architecture 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CSE 325</td>
<td>Computer System</td>
<td>3</td>
</tr>
<tr>
<td>CSE 331</td>
<td>Algorithms and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CSE 335</td>
<td>Objected-oriented Software Design</td>
<td>4</td>
</tr>
<tr>
<td>MTH 314</td>
<td>Matrix Algebra with Computational Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

(2) Computer Science Electives - Complete one of the following concentrations (9 credits):

(a) Systems - Three of the following courses:
- CSE 410 Operating Systems 3
- CSE 415 Introduction to Parallel Computing 3
- CSE 422 Computer Networks 3
- CSE 450 Translation Programming Languages 3
- CSE 480 Database Systems 3

(b) Intelligent Systems - Three of the following courses:
- CSE 402 Biometrics and Pattern Recognition 3
- CSE 404 Introduction to Machine Learning 3
- CSE 440 Introduction to Artificial Intelligence 3
- CSE 482 Big Data Analysis 3

(c) Media - Three of the following courses:
- CSE 471 Media Processing and Multimedia Computing 3
- CSE 472 Computer Graphics 3
- CSE 476 Mobile Application Development 3
- CSE 477 Web Application Architecture and Development 3

(d) Security - Three of the following courses:
- CSE 425 Introduction to Computer Security 3
- CSE 410 Operating Systems 3
- CSE 422 Computer Networks 3

(3) Ethics Requirement - One of the following courses:
- LB 322A Advances in Science and Technology - Arts and Humanities (W) 4
- LB 322B Advances in Science and Technology - Social Sciences (W) 4

The completion of LB 322A or LB 322B satisfies the ethics requirement for the major, but cannot be counted toward the Lyman Briggs College requirement.

Effective Fall 2021.

2. Request to change the requirements for the Lyman Briggs College 3 + 4 Option in Lyman Briggs College.
   a. Under the heading Lyman Briggs College 3 + 4 Option replace the last sentence of paragraph one with the following:

   Students interested in this option must be admissible to MSU and accepted into the Osteopathic Medical Scholars Program (OMSP).

Effective Fall 2021.
COLLEGE OF OSTEOPATHIC MEDICINE

1. 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 October 12, 2020 meeting.

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

      (1) In item 1., change the total credits from ‘11’ to ‘14’ and add the following course:

          PHM 813  Cardiovascular Pharmacology and Toxicology  3

      (2) In item 2., change the credits of PHM 895 from ‘3 to 6’ to ‘3 or 4’.

      (3) In item 3., add the following courses:

          PHM 811  Global Health: Pharmacology and Toxicology Perspective  2
          PHM 818  Practical Pharmacokinetics/Pharmacodynamics Modeling and Simulation in Drug Development  1
          PHM 823  Current Topics in Pharmacology and Toxicology  1
          PHM 838  Pharmacogenomics  2

      (4) In item 4., change the total credits from ‘6 to 9’ to ‘4 to 7’.

   Effective Fall 2021.

2. 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 October 12, 2020 meeting.

   The concentrations in the Master of Science degree in Pharmacology and Toxicology are noted on the student’s academic record when the requirements for the degree have been completed.

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

      (1) In item 2., add the following courses:

          PHM 811  Global Health: Pharmacology and Toxicology Perspective  2
          PHM 818  Practical Pharmacokinetics/Pharmacodynamics Modeling and Simulation in Drug Development  1
          PHM 823  Current Topics in Pharmacology and Toxicology  1
          PHM 838  Pharmacogenomics  2

   Effective Fall 2021.
CSS 411  Fire and Environmental Quality
Spring of odd years. 3(3-0) Interdepartmental with Forestry. P: (CSS 210) and (CEM 141 or LB 171 or CEM 181H) RB: BS 162 or BS 172 or BS 182H or PLB 105 or LB 144
NEW  The role of fire in cultivated and natural environments. Use of fire by humans. Combustion reactions, fire effects on soil health, and air and water quality, and impacts on human communities around the world. Local field trip required.
Effective Spring 2021

PLP 405  Plant Pathology
Spring of every year. 3(2-3) 4(2-4) P: ((BS 161 and BS 162) and completion of Tier I writing requirement) or ((PLB 105 and PLB 106) and completion of Tier I writing requirement) or ((LB 144 and LB 145) and completion of Tier I writing requirement) Plant diseases and the organisms that cause them. Principles of disease management including application of chemicals, plant breeding, biological control, and genetic engineering.
SA: BOT 405
Effective Fall 2016 Effective Spring 2020

PLP 805  Principals in Plant Pathology
Fall of every year. 2(2-0) RB: (PLP 405) or equivalent course Biodiversity of plant pathogens, molecular plant microbe interactions, microbial ecology, epidemiology, and population genetics of plant pathogens.
Effective Fall 2019 Effective Spring 2020

PLP 850  Physiological Plant Pathology
Fall of even years. 3(3-0) P: PLP 805 or concurrently RB: PLP 405 and PLB 415 NEW  Cytology of infection and mechanisms of colonization of plant by pathogens. Effects of disease on plant physiology. Plant-pathogen genetics and plant defenses.
Effective Fall 2020

PLP 881  Molecular and Biochemical Plant Pathology
Spring of even years. 3(2-2) RB: BMB 462 and ZOL 341 and PLB 415 RB: BMB 462 and IBIO 341 and PLB 415 Biochemical and molecular bases of host-pathogen interactions. Mechanisms of pathogenicity and the nature of disease resistance.
SA: BOT 881
Effective Spring 2016 Effective Spring 2020

BME 840  BioDesignIQ
Fall of every year. 3(2-3) RB: Bachelors and/or Masters degree in an engineering discipline or a biological science related to medicine. R: Open to graduate students in the College of Engineering or in the Department of Biomedical Engineering or in the Biomedical Engineering Major or approval of department.
NEW  This course will provide an introduction to medical technology innovation and entrepreneurship using the Biodesign process. Students will work in small teams of 3-5 students on design projects that strive to address areas of under-met clinical need by inventing new medical technologies. They will develop a plan to bring the new medtech into the clinic to benefit patients.
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 2020
BME 841  Translational Innovations Laboratory
BioDesignIQ2
Spring of every year. 3(1-4) 3(2-3) P: BME 840 RB: Bachelors and/or Masters degree in an engineering discipline or a biological science related to medicine. R: Open to doctoral students in the Department of Biomedical Engineering or approval of department. R: Open to doctoral students in the College of Engineering or in the Department of Biomedical Engineering or in the Biomedical Engineering Major or approval of department.
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 2016 Effective Spring 2021

BE 440  Entrepreneurial Engineering for Innovation in Health and Safety
Spring of every year. 3(3-0) P: MTH 124 or MTH 132 or LB 118 or MTH 152H or approval of department RB: Completion of Integrative Studies in Biological Sciences requirement R: Open to juniors or seniors in the College of Engineering and open to juniors or seniors in the Entrepreneurship and Innovation Minor.
NEW Entrepreneurial and innovation principles and problem-solving methodologies for scientific and engineering problems in the context of health and safety. Technology design from concept to market based on consumer needs that resolves design contradictions and risks.
Effective Spring 2021

ECE 842  Performance Modeling of Communication Networks
Fall of every year. 3(3-0) RB: ECE 280 or STT 351 R: Open to students in the Department of Electrical and Computer Engineering. Not open to students with credit in ECE 442.
NEW Fundamental theories and protocols for communication networks, with an emphasis on statistical performance modeling of Medium Access Control, Data Link Control, Routing, and Transport Layer Protocols. Network analysis and design using optimization techniques and statistical tools including Markov Processes, Queueing Theory, and emerging machine learning methodologies such as Reinforcement Learning. Simulation based and application-driven hands on class projects in support of lecture material.
Effective Fall 2020

EGR 893  Graduate Experiential Education
Fall of every year. Spring of every year. Summer of every year. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering. Approval of department.
Faculty-mentored graduate research or educational employment experience in industry or government.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Summer 2020 Effective Spring 2021

EGR 993  Engineering Research Writing
Fall of every year. Spring of every year. Summer of every year. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering. Approval of department.
Support for students engaged in substantial writing projects such as thesis or dissertation.
Request the use of the Pass-No Grade (P-N) system.
Effective Summer 2020 Effective Spring 2021
COLLEGE OF HUMAN MEDICINE

FM 613  Clinical Research in Family Practice
Clinical Research in Family Medicine
Fall of every year. Spring of every year. Summer of every year. 6 to 12 credits. 3 to 6 credits. 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. RB: FM 608 and MED 608 and PED 600 and SUR 608 and PSC 608 and OGR 608 R: Open to graduate-professional students in the College of Human Medicine. 
Investigation of clinical research topics in family practice. Application of survey and epidemiologic research methods. Use of clinical data. Investigation of clinical research topics in family medicine. Application of survey and epidemiologic research methods. Use of clinical data. 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 3 semesters after the end of the semester of enrollment. Effective Summer 2013 Effective Fall 2020

FM 616  Rural Family Practice Elective
Rural Family Medicine Elective
Fall of every year. Spring of every year. Summer of every year. 6 to 12 credits. 3 to 6 credits. 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. RB: (FM 608) and at least 3 years of medical training in the College of Human Medicine. R: Open to graduate-professional students in the College of Human Medicine. Clerkship in the unique issues and medical care of residents in rural communities. Emphasis of the clerkship is on patient care management by the family physician. Request the use of the Pass-No Grade (P-N) system. Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment. Effective Summer 2013 Effective Fall 2020

FM 620  Family Practice Subinternship
Fall of every year. Spring of every year. Summer of every year. 6 credits. 3 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: FM 608 and PHD 600 and MED 608 and PSC 608 and OGR 608 and SUR 608 P: (FM 608 and PHD 600 and MED 608 and PSC 608 and OGR 608 and SUR 608) or (FM 641 and PHD 641 and MED 641 and PSC 641 and OGR 641) R: Approval of department. Care and management of patients in a family physician's office in a medically underserved community. Required project on integration of population based medicine into routine clinical care. Request the use of the Pass-No Grade (P-N) system. Request the use of ET-Extension to postpone grading. The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment. Effective Summer 2013 Effective Fall 2020

HM 627  Interdisciplinary Exploration with Special Populations: Veterans Affairs
Interdisciplinary VA medical education elective in the care of a Veteran population within a Federal Veterans' Affairs system. Students may work with a variety of preceptors from various specialties. 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 2020
COLLEGE OF NURSING

NUR 323  Nursing Care of the Acute and Chronically Ill Patients I
Fall of every year. Spring of every year. Summer of every year. 5(2-9) P: (NUR 300 or NUR 301) and (MMG 201 and MMG 302) and (NUR 205 and PHM 350) P: (NUR 300 or NUR 301) and (NUR 205 and PHM 350)
Nursing process and clinical judgment to provide care for chronically and acutely ill adult patients at a novice level. Effective Fall 2019 Effective Fall 2020

NUR 333  Health Promotion
Fall of every year. Spring of every year. Summer of every year. 4(3-3) P: (HNF 150 and PHM 350 and NUR 205 and NUR 301 and MMG 201 and MMG 302) and (HDFS 225 or PSY 238) P: (HNF 150 and PHM 350 and NUR 205 and NUR 301 and MMG 302) and (HDFS 225 or PSY 238)
Principles and practices of health promotion/risk reduction through understanding and developing health capacity for populations, families, and individuals. Effective Fall 2020

NUR 353  BSNs Promoting Health Across the Care Continuum
Fall of every year. Spring of every year. 3(3-0) R: Open to undergraduate students in the College of Nursing or in the Nursing Major.
NEW Health promotion and risk reduction of individuals across the lifespan in the context of their families and environments including those from diverse and vulnerable populations. Effective Fall 2020

NUR 491H  Research in Nursing - Honors
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. RB: Completion of Tier I Writing Requirement R: Open to undergraduate students in the College of Nursing or in the Nursing Major. Approval of college. C: NUR 205 concurrently.
NEW Integration of research practices to inform how research can support evidence-based nursing practice.
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 2021