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 Biosystems Engineering in the Department of Biosystems and Agricultural Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its February 10, 2020 meeting.

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

      (1) Under the heading Requirements for Both Plan A and Plan B, add the following item 3.:

         Complete one course in statistics at the 400-level or above from MSU that was not used to meet the requirements of the undergraduate degree. An approved list of courses is maintained in the department.

      (2) Under the heading Additional Requirements for Plan A delete items 2., and 3., and replace with the following:

         2. Pass a final oral examination over, and in defense of, the written thesis. The final examination is administered by the department and conducted by the student’s guidance committee.

         3. Submit at least one paper to a refereed journal before scheduling the oral examination in defense of the thesis. The student must be the primary author, and the manuscript must be based on work completed during the master’s program. The guidance committee will recommend a list of appropriate refereed journals. These requirements may be waived under extraordinary circumstances at the request of the advisor or guidance committee and approval by the graduate director and department chairperson.

         4. Provide to the major professor and to the department an electronic copy of the thesis approved by ProQuest.

      (3) Under the heading Additional Requirements for Plan B, replace the entry with the following:

         The student must:

         1. Carry out a project and pass the final examination administered by the student’s guidance committee over the course work in the student’s approved program of study.

         2. Include both a written and an oral component of the examination. The examination structure and expectations will be conveyed by the student’s guidance committee or major professor, to the student prior to the examination.

         3. Submit a formal report of the Plan B project.

Effective Fall 2020.
2. Request to change the requirements for the Doctor of Philosophy degree in Biosystems Engineering in the Department of Biosystems and Agricultural Engineering. The University Committee on Graduate Studies (UCGS) will consider this request at its February 10, 2020 meeting.

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

      1. Complete a minimum of 38 additional course credits (excluding BE 899 or BE 999) beyond the bachelor’s degree, at the 400-level or higher, approved by the student’s guidance committee. The specific courses that a student is required to complete will depend on prior academic background in relation to the selected area of study and research, and must include the following:

         BE  815  Experimentation and Instrumentation in Biosystems Engineering  3
         BE  820  Research Methods in Biosystems Engineering  1
         BE  835  Modeling Methods in Biosystems Engineering  3
         BE  892  Biosystems Engineering Seminar  1

      2. Complete one course in a biological science at Michigan State University at the 400-level or above. The courses applied to the bachelor’s program cannot be used to satisfy this requirement. An approved list of courses will be maintained by the department.

      3. Complete one course in quantitative analysis or mathematics at Michigan State University at the 400-level or above. The courses applied to the bachelor’s program cannot be used to satisfy this requirement. An approved list of courses will be maintained by the department.

      4. Complete one course in statistics at Michigan State University at the 800-level or above. The courses applied to the bachelor’s program cannot be used to satisfy this requirement. An approved list of courses will be maintained by the department.

      5. Complete a minimum of 24 credits of BE 999 Doctoral Dissertation Research. Students may not exceed 36 credits of BE 999.

      6. Pass the doctoral qualifying examination.

      7. Pass the doctoral comprehensive examination within five years of the date of first course enrollment that counts to the student’s program of study and at least six months prior to the final oral examination in defense of the dissertation. The examination may be retaken once.

      8. Submit at least two papers to refereed journals before scheduling the oral examination in defense of the dissertation. The student must be the primary author, and the manuscripts must be based on work completed during the Ph.D. program. The guidance committee will recommend a list of appropriate refereed journals. This requirement can be waived under extraordinary circumstances at the request of the advisor or guidance committee and approval by the graduate director and department chairperson.

      9. Pass the final oral examination in defense of the dissertation. The examination may be retaken once.

     10. Provide to the major professor, and to the department, an electronic copy of the dissertation approved by ProQuest.

Effective Fall 2020.
3. Request to change the requirements for the **Bachelor of Science** degree in **Dietetics** in the Department of Food Science and Human Nutrition.

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

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

   - HNF 377 Applied Community Nutrition 4
   - HNF 400 Arts and Science of Food Preparation 2

   Add the following courses:

   - HNF 377 Applied Community Nutrition 3
   - HNF 377L Applied Nutrition Assessment Laboratory 1
   - HNF 446 Applied Culinary Nutrition 2

   (2) In item 3. b. delete item (4):

   The following course (3 credits):
   CSE 101 Computing Concepts and Competencies 3
   Students who pass a waiver examination will not be required to complete Computer Science and Engineering 101.

   Effective Fall 2020.

4. Request to change the requirements for the **Bachelor of Science** degree in **Nutritional Sciences** in the Department of Food Science and Human Nutrition.

   The concentrations in the Bachelor of Science degree in Nutritional Sciences are noted on the student’s academic record when the requirements for the degree have been completed.

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

   (1) In item 3. a. (5), add ‘HNF 475’ to the list of courses in sentence three.

   (2) In item 3. b. under the **Global Nutrition and Health** concentration, make the following changes:

   (a) In item (1) change the credits of ‘HNF 377’ from ‘4’ to ‘3’ and add the following course:

   - HNF 377L Applied Nutrition Assessment Laboratory 1

   (b) In item (8) add the following course with the following additional note:

   - HNF 475 International Studies in Human Nutrition 3

   A course used to fulfill requirement 3. a. (5) may not be used to fulfill this requirement.

   (3) In item 3. b. under the **Public Health Nutrition** concentration, make the following changes:

   (a) Change the total credits from ‘40 to 44’ to ‘39 to 43’.

   (b) In item (1) change the total credits from ‘23 to 22’ and change the credits of ‘HNF 377’ from ‘4’ to ‘3’
(c) In item (5) add the following course with the following note:

HNF  475   International Studies in Human Nutrition     3

A course used to fulfill requirement 3. a. (5) may not be used to fulfill this requirement.

Effective Fall 2020.

**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. b. change the total credits from ‘28’ to ‘32’ and add the following courses:

          CSE  300   Social, Ethical, and Professional Issues in Computer Science     1
          MTH  314   Matrix Algebra with Computational Applications     3

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

          CSE  404   Introduction to Machine Learning     3

   Effective Fall 2020.

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:

      (1) Change item 2. delete the following courses:

          CSE  410   Operating Systems     3
          CSE  422   Computer Networks     3
          CSE  425   Introduction to Computer Security     3
          CSE  435   Software Engineering     3
          CSE  450   Translation of Programming Languages     3
          CSE  473   Fundamentals of 3D Game Development     3
          CSE  484   Information Retrieval     3

          Add the following courses:

          CSE  325   Computer Systems     3
          CSE  402   Biometrics and Pattern Recognition     3
          CSE  404   Introduction to Machine Learning     3
          CSE  431   Algorithm Engineering     3
          CSE  482   Big Data Analysis     3

   Effective Fall 2020.
3. Request to change the requirements in the Bachelor of Science degree in Computational Data Science in the Department of Computer Science and Engineering.

   a. Under the heading Requirements for the Bachelor of Science Degree in Computational Data Science make the following change:

      (1) In item 3. b. change the total credits from ‘43’ to ‘44’ and add the following course:

          CSE 300 Social, Ethical, and Professional Issues in Computer Science 1

      Effective Fall 2020.

LYMAN BRIGGS COLLEGE

1. Request to change the requirement for the History, Philosophy and Sociology of 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 6. History, Philosophy and Sociology of Science with the following:

      A minimum of 24 credits in 300–400 level courses chosen from the following with History, Philosophy, and Sociology of Science content approved by the student's HPS academic advisor. Courses used to fulfill the Lyman Briggs College graduation requirements and LB 492 may not be used to fulfill these requirements. A minimum of four courses from Lyman Briggs must be selected. Additional courses outside of Lyman Briggs may be used with advisor approval.

      CSUS 310 History of Environmental Thought and Sustainability 3
      CSUS 463 Food Fight: Politics of Food 3
      CSUS 464 Environmental and Natural Resource Policy in Michigan 3
      ENG 473A Literature and Medicine 3
      FW 439 Conservation Ethics 3
      GEO 435 Geography of Health and Disease 3
      HST 420 History of Sexuality since the 18th Century 3
      HST 425 American and European Health Care since 1800 4
      HRT 486 Biotechnology in Agriculture: Applications and Ethical Issues 3
      IBIO 446 Environmental Issues and Public Policy 3
      LB 304 Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ) and Sexuality Studies 3
      LB 321A Science and the Public- Arts and Humanities (W) 4
      LB 321B Science and the Public- Social Sciences (W) 4
      LB 322A Advances in Science and Technology- Arts and Humanities (W) 4
      LB 322B Advances in Science and Technology- Social Sciences (W) 4
      LB 323A Science in a Global Context- Arts and Humanities (W) 4
      LB 323B Science in a Global Context- Social Sciences (W) 4
      LB 324A Science and Sex, Gender, Sexuality- Arts and Humanities (W) 4
      LB 324B Science and Sex, Gender, Sexuality- Social Sciences (W) 4
      LB 325A Science and the Environment- Arts and Humanities (W) 4
      LB 325B Science and the Environment- Social Sciences (W) 4
      LB 326A Medicine and Health- Arts and Humanities (W) 4
      LB 326B Medicine and Health- Social Sciences (W) 4
      LB 327A Scientific Practice- Arts and Humanities (W) 4
      LB 327B Scientific Practice- Social Sciences (W) 4
      LB 490E Advanced Direct Study- History, Philosophy, Sociology of Science (W) 1 to 4
      MC 351 Science and Social Policy 4
Effective Summer 2020.

2. Request to change the requirement for the Minor in History, Philosophy and Sociology of Science in Lyman Briggs College.

   a. Under the heading Requirements for Minor in History, Philosophy and Sociology of Science replace the entire entry with the following:

   A minimum of 20 credits in 300–400 level courses chosen from the following with History, Philosophy, and Sociology of Science content approved by the student's HPS academic advisor. A minimum of three courses from Lyman Briggs must be selected. Additional courses outside of Lyman Briggs may be used with advisor approval.

   CSUS 310 History of Environmental Thought and Sustainability 3
   CSUS 463 Food Fight: Politics of Food 3
   CSUS 464 Environmental and Natural Resource Policy in Michigan 3
   ENG 473A Literature and Medicine 3
   FW 439 Conservation Ethics 3
   GEO 435 Geography of Health and Disease 3
   HST 420 History of Sexuality since the 18th Century 3
   HST 425 American and European Health Care since 1800 4
   HRT 486 Biotechnology in Agriculture: Applications and Ethical Issues 3
   IBIO 446 Environmental Issues and Public Policy 3
   LB 304 Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ) and Sexuality Studies 3
   LB 321A Science and the Public- Arts and Humanities (W) 4
   LB 321B Science and the Public- Social Sciences (W) 4
   LB 322A Advances in Science and Technology- Arts and Humanities (W) 4
   LB 322B Advances in Science and Technology- Social Sciences (W) 4
   LB 323A Science in a Global Context- Arts and Humanities (W) 4
   LB 323B Science in a Global Context- Social Sciences (W) 4
   LB 324A Science and Sex, Gender, Sexuality- Arts and Humanities (W) 4
   LB 324B Science and Sex, Gender, Sexuality- Social Sciences (W) 4
   LB 325A Science and the Environment- Arts and Humanities (W) 4
   LB 325B Science and the Environment- Social Sciences (W) 4
   LB 326A Medicine and Health- Arts and Humanities (W) 4
   LB 326B Medicine and Health- Social Sciences (W) 4
   LB 327A Scientific Practice- Arts and Humanities (W) 4
   LB 327B Scientific Practice- Social Sciences (W) 4
   LB 490E Advanced Direct Study- History, Philosophy, Sociology of Science (W) 1 to 4
   MC 350 Evolution and Society 4
   MC 351 Science and Social Policy 4
   PHL 380 Nature of Science 3
   PHL 462 Philosophy of Mind 3
   PHL 480 Philosophy of Science 4
   SOC 368 Science, Technology, and Society 4
   SOC 452 Advanced Seminar in Environmental Sociology 3
   SOC 475 Health and Society 3

Effective Summer 2020.
COLLEGE OF NURSING

1. Request to change the requirements for the Bachelor of Science in Nursing degree in Nursing in the College of Nursing.

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

(1) In item 1., replace paragraph three with the following:

Students who are enrolled in the Nursing major leading to the Bachelor of Science in nursing degree in the College of Nursing complete an alternative track to Integrative Studies in Biological and Physical Sciences that consists of the following courses: Biological Science 161, Chemistry 141 and 161, Microbiology and Molecular Genetics 201 and 302. Human Anatomy 350, and Physiology 250 or 310. The completion of Chemistry 161 and Microbiology and Molecular Genetics 302 satisfy the laboratory requirement.

(2) In item 1., replace paragraph four with the following:

The University's Tier II writing requirement for the Nursing major is met by completing Nursing 342 and 460, or Nursing 463. Those courses are referenced in item 2. below.

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

CEM 143 Survey of Organic Chemistry

Add the following course:

CEM 161 General Chemistry Laboratory

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

HDFS 225 Lifespan Human Development in the Family

Or

PSY 238 Developmental Psychology: Lifespan

Add the following course:

HDFS 225 Lifespan Human Development in the Family

(5) Replace item 3. a. with the following:

All of the following courses with a minimum grade of 2.0 in each NUR course (30 credits):

(1) Any 300-level ISS course

(2) NUR 351 BSN Impact on Healthcare

NUR 352 Genetics: Transforming Healthcare

NUR 353 BSN’s Promoting Health Across the Care Continuum

NUR 354 Research, ethics, and EBP for Nurses

NUR 461 Community and Population Health

NUR 462 Healthcare Policy, Regulation, and Finance

NUR 463 Scholarly Project Seminar (W)

NUR 465 Leadership Immersion

Effective Fall 2020.
FSC 475  International Studies in Food Science  
Fall of every year. Spring of every year. Summer of every year. Abroad 2 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: HNF 150 or FSC 211 R: Approval of department; application required.

NEW  Education abroad experience. Contemporary problems affecting food science and human nutrition in world, national and local communities. 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

HNF 377  Applied Community Nutrition  
Fall of every year. 4(3-2) 3(3-0) P: HNF 250 or HNF 320 R: Open to juniors or seniors in the Dietetics Major or in the Nutritional Sciences Major or in the Lyman Briggs Nutritional Sciences Coordinate Major.

Skill development in nutritional assessment including dietary, anthropometric, clinical, biochemical and ecological assessment. Skills necessary for a community nutrition practitioner including community nutrition needs assessment, relevant nutrition related programs, and nutrition education evaluation and development. Evaluation of dietary behavior change utilizing learning and behavior change theories. Understanding of health policy and how nutrition professionals can impact policy. Effective Fall 2016 Effective Fall 2020

HNF 377L  Applied Nutrition Assessment Laboratory  
Fall of every year. 1(0-2) P: HNF 377 or concurrently R: Open to juniors or seniors in the Dietetics Major or in the Nutritional Sciences Major or in the Lyman Briggs Nutritional Sciences Coordinate Major.

NEW  Skills for dietetic and global nutrition practitioners: communication skills, community needs analyses, and anthropometric, dietary, and clinical assessments. Effective Fall 2020

HNF 440  Foodservice Operations  
Fall of every year. 3(3-0) P: HNF 150 P: HNF 150 and (HNF 300 or concurrently) R: Open to juniors or seniors in the Dietetics Major.

Principles, processes and control strategies in foodservice operations. Menu planning, procurement, and on-premise storage and issuance. Purchasing, ethics, production, safety and sanitation. Effective Fall 2017 Effective Fall 2020

HNF 446  Applied Culinary Nutrition  
Spring of every year. 2(3-3) P: HNF 300 and HNF 440

Person-centered approach to dining through food selection, culinary preparation techniques, menu extension planning, food safety, and quality assurance. Offered half of semester. Effective Fall 2020

HNF 475  International Studies in Human Nutrition  
Fall of every year. Spring of every year. Summer of every year. 2 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P: HNF 150 or FSC 211 R: Approval of department; application required.

NEW  Education abroad experience. Contemporary problems affecting food science and human nutrition in world, national and local communities. 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
PKG 486  Packaging Senior Capstone  (W)
Fall of every year. Spring of every year. 3(3-0) P: (PKG 485) and completion of Tier I writing
requirement R: Open to undergraduate students in the Packaging Major.
Development of a team-based packaging design project serving specific product and
market needs. In depth team report of feasibility, specifications, sourcing, marketing,
value-chain economics, and sustainability.
DELETE COURSE
Effective Fall 2019

COLLEGE OF ENGINEERING

CSE 102  Algorithmic Thinking and Programming
Fall of every year. Spring of every year. Summer of every year. 3(1-4) 3(2-2) P: (MTH 103 or MTH
103B or MTH 116 or MTH 124 or MTH 132 or MTH 152H or LB 118) or designated score on
Mathematics Placement test Not open to students with credit in CSE 231.
The fundamentals of computing, algorithms and programming, using a high-level
language such as Python. Integrating programs with other applications.
Effective Fall 2019 Effective Fall 2020

CSE 201  Fundamentals of Information Technology
Fall of every year. Spring of every year. 3(3-0) P: (CSE 101 or CSE 131) and (MTH 103 or MTH
116 or MTH 124 or MTH 132 or MTH 152H or LB 118) P: (CSE 102 or CSE 220 or CSE 231) and
(MTH 103 or MTH 116 or MTH 124 or MTH 132 or MTH 152H or LB 118) RB: high school algebra;
literacy in web and computer tools, such as editor and browser.
Digital representation of objects such as numbers, signals, and 3-dimensional shapes.
Algorithms that operate on digital objects. Computer communications and the Internet.
Computer security and web services.
SA: CSE 240
Effective Spring 2014 Effective Fall 2020

CSE 300  Social, Ethical, and Professional Issues in Computer Science
Fall of every year. Spring of every year. 1(1-0) A student may earn a maximum of 1 credit in all
enrollments for this course. R: Open to undergraduate students in the Computational Data Science
Major or in the Computer Science Major.
NEW
Professional responsibilities and informed judgments in computing practice based on legal
and ethical principles. Local and global impacts of computing solutions on individuals,
organizations, and society.
Effective Fall 2020

CSE 331  Algorithms and Data Structures
Fall of every year. Spring of every year. 3(3-0) P: (CSE 232) and (CSE 260 or CMSE 202) 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 and open to juniors or seniors in the College of Engineering. 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 Data Science Major and open to juniors or seniors in the
College of Engineering.
Linear data structures, trees, graphs and algorithms which operate on them. Fundamental
algorithms for searching, sorting, string matching, graph problems. Design and analysis of
algorithms.
Effective Fall 2019 Effective Fall 2020
CSE 402  Biometrics and Pattern Recognition
Fall of every year. 3(3-0) P: (CSE 331 and (STT 351 or STT 380 or STT 430 or STT 441) R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.  R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major.
Automated techniques used for feature extraction and pattern matching focusing on face, fingerprint and iris recognition.

Effective Fall 2019 Effective Fall 2021

CSE 410  Operating Systems
Fall of every year. 3(3-0) P: (CSE 232 and CSE 260) and CSE 325 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor 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 juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
SA: CPS 410

Effective Fall 2019 Effective Fall 2020

CSE 415  Introduction to Parallel Computing
Spring of every year. 3(3-0) P: CSE 320 and CSE 331 P: (CSE 320 or ECE 331) and (MTH 314 or ECE 280) and CSE 331 R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.  R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major.  Not open to students with credit in CMSE 401.
Core principles and techniques of parallel computing including architectures, programming models, and algorithm design.  Performance analysis and optimization.  Use of parallel computers.

Effective Fall 2019 Effective Fall 2021

CSE 420  Computer Architecture
Spring of every year. Spring of odd years. 3(3-0) P: (CSE 232 and CSE 260) and (CSE 320 or ECE 331) P: (CSE 232 and CSE 260) and CSE 325 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor 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 Fall 2017 Effective Fall 2020
CSE 422  Computer Networks  
Fall of every year. Spring of every year. 3(3-0) P: (STT 351 or ECE 280 or STT 430 or STT 441)
and CSE 325  R: Open to juniors or seniors in the College of Engineering or in the Computer
Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs
Computer Science Major.  R: Open to juniors or seniors in the College of Engineering or in the
Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science
Major.
Computer network architectures and models. Physical media and signaling. Data link
protocols. Medium access control. Routing and IP. Transport services including TCP/UDP.
Network applications. Local-area and wide-area networks.
SA: CPS 422
Effective Fall 2019 Effective Fall 2020

CSE 425  Introduction to Computer Security  
Spring of every year. 3(3-0) P: CSE 422 or concurrently P: (CSE 422 or concurrently) or (ECE 442
or concurrently) R: Open to juniors or seniors in the College of Engineering or in the Computer
Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs
Computer Science Major.  R: Open to juniors or seniors in the College of Engineering or in the
Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science
Major.
Theory and practice of security engineering. Security protocols. Cryptography and
cryptanalysis. Smartcards. Network security and intrusion detection. Common system
attacks.
Effective Fall 2017 Effective Fall 2020

CSE 429  Interdisciplinary Topics in CyberSecurity  
Spring of every year. 3(3-0) Interdepartmental with Criminal Justice. P: CSE 101 or CSE 131 or
CSE 331 P: CSE 102 or CSE 231 R: Open to juniors or seniors or graduate students.
Technical, legal, criminal, medical business, and communication aspects of
CyberSecurity.
Effective Fall 2017 Effective Fall 2020

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 juniors or seniors in the College of Engineering or in the Computer Science Minor or in
the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science
Major.  R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs
Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
Software lifecycle including specification, design, coding, testing, and verification of a
software product. Stepwise refinement and traceability. Software maintenance and
documentation.
Effective Fall 2017 Effective Fall 2020

CSE 440  Introduction to Artificial Intelligence  
Fall of every year. 3(3-0) P: (CSE 331) and (MTH 314 or ECE 280) R: Open to juniors
or seniors in the College of Engineering or in the Computer Science Major or in the Lyman Briggs
Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.  R: Open to
juniors or seniors in the College of Engineering 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 Data Science Major.
Fundamental issues in intelligent systems. Knowledge representation and mechanisms of
reasoning. Search and constraint satisfaction. Agents. Application areas of AI and current
topics.
SA: CPS 440
Effective Fall 2017 Effective Fall 2021
CSE 450  Translation of Programming Languages  
Fall of every year. 3(3-0) P: CSE 331 and (CSE 320 or ECE 331) R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major. 
SA: CPS 450  
Effective Fall 2017 Effective Fall 2020

CSE 471  Media Processing and Multimedia Computing  
Spring of every year. 3(3-0) P: CSE 320 or CSE 331 or CSE 335 and (MTH 314 or ECE 280) R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major. 
Effective Fall 2017 Effective Fall 2021

CSE 472  Computer Graphics  
Spring of every year. 3(3-0) P: CSE 331 or CSE 335 and (MTH 314 or ECE 280) R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major. 
SA: CPS 472  
Effective Fall 2017 Effective Fall 2021

CSE 480  Database Systems  
Spring of every year. 3(3-0) P: CSE 331 or CSE 335 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major. R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major. 
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 Fall 2017 Effective Fall 2020

CSE 482  Big Data Analysis  
Spring of every year. 3(3-0) P: (CSE 331) and (STT 351 or STT 380 or STT 430 or STT 441) P: (CSE 331) and (STT 351 or STT 380 or STT 430 or STT 441) and MTH 314 and (MTH 234 or MTH 254H or LB 220) R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major. R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major. 
Data collection, storage, and preprocessing, and analysis techniques. Programming for large-scale data analysis. Case studies and applications. 
Effective Fall 2019 Effective Fall 2021
CSE 499  Undergraduate Research  
Fall of every year. Spring of every year. Summer 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 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. Approval of department.

NEW  Independent undergraduate research in contemporary areas of computer science. 
Request the use of the Pass-No Grade (P-N) system. 
Effective Fall 2020

CSE 820  Advanced Computer Architecture  
Fall of every year. Fall of even years. Spring of every year. 3(3-0) Interdepartmental with Electrical and Computer Engineering. RB: CSE 410 and CSE 420 RB: CSE 325 and CSE 420 R: Open only to Computer Science or Electrical Engineering majors. R: Open to graduate students in the Department of Computer Science and Engineering or in the Department of Electrical and Computer Engineering.  
Instruction set architecture. Pipelining, vector processors, cache memory, high bandwidth memory design, virtual memory, input and output. Benchmarking techniques. New developments related to single CPU systems. Advanced concepts in computer architecture. Various hardware and software technologies including caching, pipelining, vector processing and parallelism are examined in detail. Issues related to the design of multicore processors, GPUs, computer clusters and domain specific architectures are covered.  
SA: CPS 820  
Effective Summer 1999 Effective Spring 2020

ECE 884  Neural Networks and Deep Learning  
Fall of every year. 3(3-0)  
Effective Fall 2019

EGR 193  Engineering Experiential Education Freshman Seminar  
Fall of every year. 1(1-0) RB: Students must have participated in a paid, supervised engineering experience. R: Open to freshmen in the College of Engineering. Approval of department.  
NEW  EGR 193 a one credit course for First year engineering students. They will reflect on previous experience and learn to explore future opportunities. Students will be guided in exploring their post-graduation professional options. You must have been employed in a paid, supervised, evaluated, career-related position to be eligible for this course. Students submit a request for admission to this course through a written application process. This course does not count towards any technical elective waivers within the departments. Request the use of the Pass-No Grade (P-N) system. 
Effective Fall 2020

EGR 391  Engineering Experiential Education 1  
Fall of every year. Spring of every year. Summer of every year. 1(1-0) R: Open to undergraduate students in the College of Engineering.  
NEW  EGR 391 Engineering Experiential Education I is a one credit course designed to enhance a student's technical experience in their 1st work term by simulating opportunities for all aspects of professional development and assessment of expectations. Areas of focus are based on the student’s individual technical position and include professional communication, establishing expectations, and learning from failures. Students will be held to a high standard of accountability and professional ideals. Position must fall within college’s guidelines for approval.  
Request the use of the Pass-No Grade (P-N) system.  
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
EGR 392  Engineering Experiential Education II
Fall of every year. Spring of every year. Summer of every year. 1(1-0) P: EGR 391 R: Open to undergraduate students in the College of Engineering.
NEW  EGR 392 Engineering Experiential Education II is a one credit course designed to enhance current technical experience in their 2nd work term for all aspects of professional development and assessment of expectations. Areas of focus are based on the student’s technical position and include goal setting, being mindful for professional success, and understanding diversity and inclusion. Students will be held to a high standard of accountability and professional ideals. Position must fall within college’s guidelines for approval.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2020

EGR 493  Advanced Engineering Experiential Education I
Fall of every year. Spring of every year. Summer of every year. 1(1-0) P: EGR 392 R: Open to undergraduate students in the College of Engineering.
NEW  EGR 493 Advanced Engineering Experiential Education I a one credit course designed to enhance a student's technical experience 3rd work term by simulating opportunities for all aspects of professional development and assessment of expectations. Areas of focus are based on the student’s technical position and include professional ethics, economics and lifelong learning. Students will be held to a high standard of accountability and professional ideals. Position must fall within college’s guidelines for approval.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2020

EGR 494  Advanced Engineering Experiential Education II
Fall of every year. Spring of every year. Summer of every year. 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course. P: EGR 493 R: Open to undergraduate students in the College of Engineering.
NEW  EGR 494 Advanced Engineering Experiential Education II a one credit course designed to enhance a student's experiential education 4th or 5th work term by simulating opportunities for all aspects of professional development and assessment of expectations. Areas of focus are based on the student’s technical position and include project management, work life balance, and value propositions. Students will be held to a high standard of accountability and professional ideals. Position must fall within college’s guidelines for approval.
Request the use of the Pass-No Grade (P-N) system.
Request the use of ET-Extension to postpone grading.
The work for the course must be completed and the final grade reported within 1 semester after the end of the semester of enrollment.
Effective Fall 2020

ME 836  Experimental Methods in Fluid Mechanics
Fall of every years. 3(1-4) 3(2-2)
Modern techniques of fluid mechanics measurement and data analysis. Pressure, temperature and velocity measurement techniques. Optical diagnostics.
Effective Summer 1997 Effective Fall 2020
### COLLEGE OF HUMAN MEDICINE

**RAD 612**  
Interventional Radiology  
Fall of every year. Spring of every year. Summer of every year. 3 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: RAD 609  
P: RAD 609 or RAD 610  
R: Open to graduate-professional students in the College of Human Medicine or in the College of Osteopathic Medicine.  
Fundamentals of radiation biology, diagnostic and therapeutic techniques, safety, and follow-up of interventional radiology procedures.  
Request the use of the Pass-No Grade (P-N) system.  
Request the use of ET-Extension to postpone grading.  
The work for the course must be completed and the final grade reported within 2 semesters after the end of the semester of enrollment.  
Effective Fall 2018  
Effective Spring 2020

### COLLEGE OF NATURAL SCIENCE

**CMSE 201**  
Introduction to Computational Modeling and Data Analysis  
Computational Modeling and Data Analysis I  
Fall of every year. Spring of every year. 4(4-0)  
P: MTH 124 or MTH 132 or MTH 152H or LB 118  
Computational modeling using a wide variety of applications examples. Algorithmic thinking, dataset manipulation, model building, data visualization, and numerical methods all implemented as programs.  
SA: NSC 204  
Effective Fall 2019  
Effective Fall 2020

**CMSE 202**  
Computational Modeling Tools and Techniques  
Computational Modeling and Data Analysis II  
Fall of every year. Spring of every year. 4(4-0)  
P: CMSE 201  
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. 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, machine learning.  
SA: NSC 205  
Effective Fall 2019  
Effective Fall 2020

**CMSE 410**  
Bioinformatics and Computational Biology  
Spring of every year. 3(2-2)  
Interdepartmental with Biochemistry and Molecular Biology and Microbiology and Molecular Genetics and Plant Biology.  
P: ((CMSE 201 and LB 144 and LB 145) or (CMSE 201 and BS 161 and BS 162) or (CMSE 201 and BS 181H and BS 182H)) and (STT 200 or STT 201 or STT 231 or STT 421 or STT 351 or ECE 280)  
Not open to students with credit in CSE 415.  
Computational approaches in modern biology with a focus on applications in genomics, systems biology, evolution, and structural biology.  
Effective Fall 2019  
Effective Fall 2020

**PHY 173**  
Studio Physics for Scientists and Engineers I  
Fall of every year. Spring of every year. 5(4-2)  
P: (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently) Not open to students with credit in LB 273 or PHY 183 or PHY 183B or PHY 191 or PHY 193H or PHY 221 or PHY 231 or PHY 231c or PHY 233b or PHY 241.

**NEW**  
Basic principles of mechanics, development of scientific skills and problem-solving through integrated physics laboratory and discussion activities.  
Effective Fall 2020
PHY 174  Studio Physics for Scientists and Engineers II  
Fall of every year. Spring of every year. 5(4-2) P: {((MTH 133 or concurrently) or (MTH 153H or concurrently) or (LB 119 or concurrently)) and PHY 173) or (PHY 183 and PHY 191) or (PHY 183B and PHY 191) or (PHY 193H and PHY 191) or LB 273 Not open to students with credit in LB 274 or PHY 184 or PHY 184B or PHY 192 or PHY 222 or PHY 232 or PHY 232c or PHY 234b or PHY 242 or PHY 294H. 

NEW  Basic principles of electricity and magnetism, development of scientific skills and problem-solving through integrated physics laboratory and discussion activities. 
Effective Fall 2020

PHY 221  Studio Physics for Life Scientists I  
Fall of every year. Spring of every year. 4(3-2) P: (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently) Not open to students with credit in LB 273 or PHY 173 or PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231C or PHY 233B or PHY 241 or PHY 251. 

NEW  Basic principles of mechanics including applications to biological systems, development of scientific skills and problem-solving through integrated physics laboratory and discussion activities. 
Effective Fall 2020

PHY 222  Studio Physics for Life Scientists II  
Fall of every year. Spring of every year. 4(3-2) P: {((MTH 124 or MTH 132 or MTH 152H or LB 118) and (PHY 221 or LB 273)) or (PHY 231 and PHY 251) or (PHY 231C and PHY 251) or (PHY 183 and PHY 191) or (PHY 193H and PHY 191) Not open to students with credit in LB 274 or PHY 174 or PHY 184 or PHY 184b or PHY 192 or PHY 232 or PHY 232c or PHY 234b or PHY 242 or PHY 252. 

NEW  Basic principles of electricity and magnetism including applications to biological systems, development of scientific skills and problem-solving through integrated physics laboratory and discussion activities. 
Effective Fall 2020

COLLEGE OF NURSING

NUR 205  Introduction to Professional Nursing  
Fall of every year. Spring of every year. Summer of every year. 4(2-6) P: CEM 143 and PSY 101 and HDFS 225 P: (PSY 101) and (HDFS 225 or PSY 238) RB: Not open to RN-BSN students. R:  
Open to students in the Nursing Major. 
Principles and practices of holistic nursing care that allow for analysis of a comprehensive collection of patient data to provide basic clinical care to the adult population.  
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: HDFS 225 and HNF 150 and HNF 150 and NUR 301 and PHM 350 and MMG 201 and MMG 302 P: (HNF 150) and PHM 350 and NUR 205 and NUR 301 and MMG 201 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 2019 Effective Fall 2020

NUR 351  BSN Impact on Healthcare  
Fall of every year. Spring of every year. 3(3-0) R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major. 
NEW  Application of BSN curricular constructs to nursing practice, role differentiation and contribution of BSN nurse to healthcare. 
Effective Fall 2020
NUR 352  Genetics: Transforming Healthcare  
Fall of every year. Summer of every year. 3(3-0) R: Open to undergraduate students in the College of Nursing or in the Nursing Major or approval of college.  
NEW  Competencies and concepts in genetics and genomics for providing care to individuals, families and communities.  
Effective Fall 2020  

NUR 354  Research, Ethics and EBP for Nurses  
Fall of every year. Spring of every year. 3(3-0) R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major.  
NEW  Introduction to evidence-based practice and research methodology to inform ethical nursing practice.  
Effective Fall 2020  

NUR 461  Community and Population Health  
Spring of every year. Summer of every year. 4(3-2) P: NUR 353 R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major.  
NEW  Promoting and protecting public well-being using health promotion, risk reduction, and disease management strategies.  
Effective Fall 2020  

NUR 462  Healthcare Policy, Regulation, and Finance  
Spring of every year. Summer of every year. 3(3-0) R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major.  
NEW  Influence and responsibility of professional nursing to society using organizational, legislative, financial and regulatory environments and processes.  
Effective Fall 2020  

NUR 463  Scholarly Project Seminar (W)  
Spring of every year. Summer of every year. 3(3-0) P: (NUR 351 and NUR 354) and completion of Tier I writing requirement R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major.  
NEW  Application of evidence-based practice and research methodology to inform ethical nursing practice.  
Effective Fall 2020  

NUR 464  Health in Our World (D)  
Fall of every year. Spring of every year. 4(4-0) R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major.  
NEW  This course provides a broad view of select local and global issues and their impact on health and humanity. Students will acquire and analyze current information around health and human behaviors through the lenses of multiple social science perspectives.  
Effective Fall 2020  

NUR 465  Leadership Immersion  
Fall of every year. Spring of every year. Summer of every year. 4(3-1) 4(3-2) P: NUR 355 and NUR 336 RB: Registered Nurse admitted to the RN-BSN program. R: Open to students in the Nursing Major. R: Open to undergraduate students in the College of Nursing or in the College of Nursing or in the Nursing Major. Not open to students with credit in NUR 460. C: NUR 455 concurrently.  
NEW  Integration and application of theories, principles and practices of nursing leadership and management into contemporary practice settings. Integration and application of theories, principles and practices of nursing leadership and management  
Effective Spring 2014 Effective Fall 2020
COLLEGE OF OSTEOPATHIC MEDICINE

OST 558  Pediatrics III
Fall of every year. 1(1-0) R: Open to graduate students in the College of Osteopathic Medicine.
Normal structure, function and pathologies of the behavioral, cardiovascular, hematopoietic and respiratory systems as they relate to the pediatric population. Ethical considerations in pediatrics.
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 Fall 2018 Effective Fall 2020

OST 591  Medical Case Study Journal Review
Fall of every year. Spring of every year. Summer of every year. 1(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. R: Open to graduate-professional students in the College of Osteopathic Medicine.
Analysis and presentation of clinical case reports in the criteria required to identify case reports published in reputable journals containing clinically consistent basic science principles and biomedical concepts.
Request the use of the Pass-No Grade (P-N) system.
Effective Summer 2018 Effective Spring 2020

OST 593  Scholarly Activity Seminar
Fall of every year. Summer of every year. 1(1-0) R: Open to students in the College of Osteopathic Medicine.
NEW Workshop introducing categories of scholarly activity applicable to graduate medical education and developing ability to design and implement a scholarly project.
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

PA 832  Microbiology
Fall of every year. 2(1-2) Interdepartmental with Microbiology and Molecular Genetics. R: Open to students in the Department of PA Medicine.
NEW Basic principles of microbiology and their relationship to disease in humans.
Request the use of the Pass-No Grade (P-N) system.
Effective Spring 2021