Dean Satish Udpa  
College of Engineering

Re: Final report of EGR items processed on UCC  
May 1, 2009

The attached pages are an extract of agenda items processed through the University Curriculum Committee; all were approved. Aside from many housekeeping changes to existing courses and programs, the main items of activity were:

11 new courses were introduced, 1 course was deleted.

A Minor in CSS was established.

The Biomedical Engineering Option was discontinued.

A combined BS/MS degree plan was established for Civil, Environmental, Computer Science, Engineering Mechanics, and Mechanical Engineering programs.

Significant changes (update) were made in the Chemical Engineering curriculum.

Best regards,

Thomas R. Bieler, Assoc. Prof.  
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ec: Pam Cosner, Tom Wolff, Rich Enbody
PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 10

October 9, 2008

ECE 445 Biomedical Instrumentation
Fall of even years. 3(2-3) P: ECE 303 or ECE 345 R: Open to students in the College of Engineering.
NEW Fundamentals of biomedical measurements. Sensors, Instrumentation electronics, Biomedical devices, applications and case studies, Commercialization of biomedical technology, Hands-on experience with sensors, instrumentation electronics, and biomedical devices.
Effective Fall 2008

ECE 446 Biomedical Signal Processing
Fall of odd years. 3(3-0) P: ECE 366 RB: Basic linear systems and probability theory. R: Open to students in the College of Engineering. Not open to students with credit in ECE 446.
NEW Deterministic and random digital signal processing theory in the context of biomedical applications with computer projects on the analysis of real physiologic signals.
Effective Fall 2008

ECE 447 Introduction to Biomedical Imaging
Spring of even years. 3(3-0) P: ECE 366 RB: ECE 305 R: Open to students in the College of Engineering.
NEW Fundamental mathematics, physics, engineering principles, and applications of biomedical imaging techniques including ultrasound, x-ray imaging, computed tomography, nuclear medicine (including PET and SPECT), and magnetic resonance imaging.
Effective Spring 2010

ECE 448 Modeling and Analysis of Bioelectrical Systems
Spring of odd years. 3(3-0) P: ECE 366 or ECE 313 R: Open to students in the College of Engineering.
NEW Basics of deterministic and stochastic linear systems, Principles of biophysics and electrophysiology, Theory and principles of system identification, methods to formulate dynamic mathematical and computer models of bioelectrical systems, Applications to Neural Systems and Neuroprosthetics.
Effective Fall 2009

ME 854 Robust Control
Spring of even years. 3(3-0) Interdepartmental with Electrical and Computer Engineering. R: Open to students in the College of Engineering and approval of college. R: Open to graduate students in the College of Engineering.
Effective Spring 2006 Effective Spring 2009

ME 859 Nonlinear Systems and Control
Spring of every year. 3(3-0) Interdepartmental with Electrical and Computer Engineering. RB: ECE 826 and ME 857 RB: ECE 851 R: Open to students in the College of Engineering.
SA: ECE 827
Effective Summer 2006 Effective Spring 2009

ME 892 Mechanical Engineering Seminar
Fall of every year. Spring of every year. 1(1-0)
NEW Course will provide students with skills to present a seminar as well as familiarize them with various research topics in mechanical engineering. Part of the course requirement is a literature survey and a presentation in class. Students must attend ME Department...
seminars.
Request the use of the Pass-No Grade (P-N) system.
Effective Fall 2008

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 2
November 6, 2008

COLLEGE OF ENGINEERING
1. Request to establish a Minor in Computer Science in the Department of Computer Science and Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its November 6, 2008 meeting.

a. Background Information:
The Computer Science major program is available at over 2000 U.S. colleges including at Michigan State University since 1968. Computing is pervasive across all professions from accounting to zoology. Offering a minor will provide students with a formal development of computing background and knowledge of fundamental concepts and programming skills, which can be applied to many disciplines.

b. Academic Programs Catalog Text:
The Minor in Computer Science and Engineering is administered by the Department of Computer Science and Engineering. This minor will provide students with a basic foundation in computer science that is applicable to many disciplines. This will also provide opportunities for students in industry or government, as well as prepare students for graduate-level study in computer science. The minor is available as an elective to students who are enrolled in bachelor's degree programs at Michigan State University other than the Bachelor of Science Degree in Computer Science or the Bachelor of Science Degree in Computer Engineering. With the approval of the department and college that administers the student’s degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor's degree.

Students who plan to complete the requirements for the minor must apply to the Department of Computer Science and Engineering. The minimum criteria for acceptance is the completion of Computer Science and Engineering 231 and 260 with a combined grade-point average in those two courses of 3.00. Enrollment may be limited. Application forms are available at www.cse.msu.edu.

Requirements for the Minor in Computer Science
Complete 18 credits in the Department of Computer Science and Engineering from the following:

CREDITS
1. All of the following courses (12 credits):
   CSE 231 Introduction to Programming I 4
   CSE 232 Introduction to Programming II 4
   CSE 280 Discrete Structures 4
2. One of the following courses (3 credits):
   CSE 320 Computer Organization and Architecture 3
   CSE 331 Algorithms and Data Structures 3
   CSE 335 Object-Oriented Software Design 3
3. One of the following courses (3 credits):
   CSE 410 Operating Systems 3
   CSE 420 Computer Architecture 3
   CSE 422 Computer Networks 3
   CSE 425 Introduction to Computer Security 3
   CSE 435 Software Engineering 3
   CSE 440 Introduction to Artificial Intelligence 3
   CSE 450 Translation of Programming Languages 3
   CSE 452 Organization of Programming Languages 3
   CSE 460 Computability and Format Language Theory 3
   CSE 471 Media Processing and Multimedia Computing 3
   CSE 472 Computer Graphics 3
   CSE 475 Introduction to Computational Linguistics 3
   CSE 480 Database Systems 3
   CSE 484 Information Retrieval 3
Effective Summer 2009.
COLLEGE OF ENGINEERING
ECE 201 Circuits and Systems I
Fall of every year. Spring of every year. Summer of every year. 3(3-0) P: (CSE 131 or concurrently) or (CSE 231 or concurrently) and (MTH 234 or concurrently) or (MTH 254H or concurrently) or (LBS 119 or concurrently). P: (CSE 131 or concurrently) or (CSE 231 or concurrently) or (EGR 102 or concurrently) and (MTH 234 or concurrently) or (MTH 254H or concurrently) or (LBS 119 or concurrently).
SA: ECE 200
Effective Summer 2003 Effective Fall 2008

ECE 331 Microprocessors and Digital Systems
Fall of every year. Spring of every year. 4(3-3) P: CSE 231 and ECE 230 P: (CSE 232 or EGR 102) and (CSE 251 or concurrently) and CSE 230 R: Open to students in the Department of Electrical and Computer Engineering and open to students in the Department of Computer Science and Engineering.
SA: EE 331
Effective Fall 2007 Effective Fall 2008

ECE 466 Digital Signal Processing and Filter Design
Fall of every year. 3(3-0) P: ECE 366 R: Open only to seniors or graduate students in the Department of Electrical and Computer Engineering. R: Open to seniors or graduate students in the Department of Electrical and Computer Engineering or in the College of Engineering. Not open to students with credit in ECE 446.
SA: EE 466
Effective Fall 2003 Effective Fall 2008

PART II - NEW COURSES AND CHANGES -- continued - 13
January 22, 2009

COLLEGE OF ENGINEERING
CSE 835 Algorithmic Graph Theory
Fall of every year. Spring of every year. 3(3-0) RB: CSE 232 and CSE 460 and MTH 314 R: Open only to majors in the Department of Computer Science and Engineering or approval of department.
R: Open to students in the Department of Computer Science and Engineering or approval of department.
Classical concepts in Graph Theory. Algorithmic aspects of graphs such as finding paths, network flow, spanning trees and matching.
SA: CPS 835
Effective Fall 2001 Effective Fall 2009

CSE 848 Evolutionary Computation
Fall of even years. 3(3-0) Interdepartmental with Electrical and Computer Engineering. RB: CSE 841 and CSE 440 R: Open only to students in the Department of Computer Science and Engineering or approval of department.
R: Open to graduate students in the Department of Computer Science and Engineering and open to graduate students in the Department of Electrical and Computer Engineering or approval of department.
Investigation of evolutionary computation from a historical, theoretical and application viewpoint. Readings from the present literature, experiments with provided software on the application of evolutionary computation principles.
Effective Fall 1999 Effective Fall 2009
PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 2
February 19, 2009

COLLEGE OF ENGINEERING
1. Request to establish a Linked Bachelor of Science and Master of Science degree in Civil Engineering in the Department of Civil and Environmental Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its February 12, 2009 meeting. The University Graduate Council (UGC) will consider this request at its February 23, 2009 meeting.
Per University policy:
A candidate for a Linked Bachelor’s-Master’s Degree from Michigan State University may request the application of up to 9 credits toward the master’s program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master’s degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

a. Add the following statement to the Department of Civil and Environmental Engineering:

LINKED BACHELOR’S-MASTER’S DEGREE IN CIVIL ENGINEERING
Bachelor of Science Degree in Civil Engineering
Master of Science Degree in Civil Engineering
The department welcomes applications from Michigan State University Civil Engineering undergraduate students in their junior and senior year. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Civil Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.50 and an approved program of study for the Master of Science degree in Civil Engineering at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master’s program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.
Effective Fall 2009.

2. Request to establish a Linked Bachelor of Science and Master of Science degree in Environmental Engineering in the Department of Civil and Environmental Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its February 12, 2009 meeting. The University Graduate Council (UGC) will consider this request at its February 23, 2009 meeting.
Per University policy:
A candidate for a Linked Bachelor’s-Master’s Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

a. Add the following statement to the Department of Civil and Environmental Engineering:

LINKED BACHELOR’S-MASTER’S DEGREE IN ENVIRONMENTAL ENGINEERING
Bachelor of Science Degree in Civil Engineering with a concentration in Environmental Engineering
Master of Science Degree in Environmental Engineering
The department welcomes applications from Michigan State University Civil Engineering undergraduate students in their junior and senior year, who are pursuing an environmental engineering concentration within the Bachelor of Science degree in Civil Engineering. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Civil Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.50 and an approved program of study for the Master of Science degree in Environmental Engineering at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master’s program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.
Effective Fall 2009.
3. Request to establish a Linked Bachelor of Science and Master of Science degree in Computer Science in the Department of Computer Science and Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its February 12, 2009 meeting. The University Graduate Council (UGC) will consider this request at its February 23, 2009 meeting.

Per University policy:
A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

a. Add the following statement to the Department of Mechanical Engineering:

**LINKED BACHELOR'S-MASTER'S DEGREE IN COMPUTER SCIENCE**

*Bachelor of Science Degree in Computer Science*  
*Master of Science Degree in Computer Science*

The department welcomes applications from Michigan State University Computer Science undergraduate students in their junior and senior year. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Computer Science undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.50 and an approved program of study for the Master of Science degree in Computer Science at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

Effective Fall 2009.

4. Request to establish a Linked Bachelor of Science and Master of Science degree in Environmental Engineering in the Department of Civil and Environmental Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its February 12, 2009 meeting. The University Graduate Council (UGC) will consider this request at its February 23, 2009 meeting.

Per University policy:
A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

a. Add the following statement to the Department of Civil and Environmental Engineering:

**LINKED BACHELOR'S-MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING**

*Bachelor of Science Degree in Civil Engineering with a concentration in Environmental Engineering*  
*Master of Science Degree in Environmental Engineering*

The department welcomes applications from Michigan State University Civil Engineering undergraduate students in their junior and senior year, who are pursuing an environmental engineering concentration within the Bachelor of Science degree in Civil Engineering. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Civil Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.50 and an approved program of study for the Master of Science degree in Environmental Engineering at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

Effective Fall 2009.
PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 4
February 19, 2009

5. Request to establish a Linked Bachelor of Science and Master of Science degree in Mechanical Engineering in the Department of Mechanical Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its February 12, 2009 meeting. The University Graduate Council (UGC) will consider this request at its February 23, 2009 meeting.
Per University policy:
A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.
a. Add the following statement to the Department of Mechanical Engineering:

**LINKED BACHELOR'S-MASTER'S DEGREE IN MECHANICAL ENGINEERING**

**Bachelor of Science Degree in Mechanical Engineering**

**Master of Science Degree in Mechanical Engineering**
The department welcomes applications from Michigan State University Mechanical Engineering undergraduate students in their junior and senior year. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Mechanical Engineering undergraduate. Admission to the program requires a minimum undergraduate grade point average of 3.50 and an approved program of study for the Master of Science degree in Mechanical Engineering at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.
Effective Fall 2009.

PART II - NEW COURSES AND CHANGES – continued - 7
February 19, 2009

**COLLEGE OF ENGINEERING**

*** cluster of courses made interdepartmental ***

CE 821 Groundwater Hydraulics
Fall of every year. 3(3-0) Interdepartmental with Environmental Engineering. Physical properties of porous media. Equations of flow in saturated media. Flow nets, well flow and parameter measurement. Transport processes and the advective-dispersion equation for conservative contaminants.
Effective Fall 1992 Effective Fall 2009

CE 822 Groundwater Modeling
Effective Spring 2007 Effective Spring 2010

CE 823 Stochastic Groundwater Modeling
Effective Spring 2007 Effective Fall 2009

CE 829 Mixing and Transport in Surface Waters
Fall of odd years. 3(3-0) Interdepartmental with Environmental Engineering. P: ENE 801 Waves, tides and shallow-water processes. Numerical solutions and applications of
shallow-water equations to lakes, rivers and estuaries. Principles and processes of
sediment transport, and dispersion of materials in surface waters. Wind-driven circulation
in Lake Michigan.
Effective Spring 2006 Effective Fall 2009

CE 861 Introduction to Risk and Reliability in Civil & Environmental Engineering
Fall of every year. 1(1−0) Interdepartmental with Environmental Engineering. Not open to students
with credit in CE 810.
NEW Introduction to risk and reliability with the framework of civil and environmental
Effective Fall 2009

CE 862 Reliability-Based Design in Civil Engineering
Fall of odd years. 2(2−0) Not open to students with credit in CE 810. C: CE 861 concurrently.
NEW Probabilistic treatment of live and dead loads: earthquakes, floods, material properties, and
capacity. Reliability basis of design specifications, reliability index, probability of failure,
design for reliability. Reliability of engineering systems.
Effective Fall 2009

CSE 802 Pattern Recognition and Analysis
Spring of even year. 4(4–0) 3(3−0) RB: CSE 330 and MTH 314 and STT 441 RB: CSE 331 and
MTH 314 and STT 441 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.
Algorithms for classifying and understanding data. Statistical and syntactic methods,
unsupervised and supervised learning. Cluster analysis and ordination.
Exploratory data analysis. Methodology for design of classifiers.
SA: CPS 602
Effective Summer 1999 Effective Spring 2010

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 4
March 26, 2009

COLLEGE OF ENGINEERING
1. Request to change the requirements for the Bachelor of Science degree in Civil Engineering in the
Department of Civil and Environmental Engineering as updated on pages 24 to 26 of the April 15, 2008
   a. Under the heading Requirements for the Bachelor of Science Degree in Civil Engineering
make the following changes:
   (1) In the Environmental Engineering Concentration make the following changes:
   (a) In item 4. delete the following course:
       CE 806 Advanced Structural Concrete Design 3
   Add the following courses:
       CE 461 Computational Methods in Civil Engineering 3
       ME 361 Dynamics 3
   (b) Delete Item 5.
   (c) Renumber item 6. to item 5.
   Effective Fall 2009

2. Request to change the requirements for the Bachelor of Science degree in Computer Science in the
Department of Computer Science and Engineering as updated on pages 26 and 27 of the April 15, 2008
   a. Under the heading Requirements for the Bachelor of Science Degree in Computer Science
make the following changes:
   (1) In item 3. b. make the following changes:
   (a) Change the total credits from “28” to “32”.
   (b) Add the following course:
       CSE 231 Introduction to Programming I 4
   (2) In item 3. d. (1) change “MSC 327” to “MKT 327”.
   Effective Fall 2009

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3. Request to discontinue the **Biomedical Engineering Option (College)** in the College of Engineering. The Biomedical Engineering Option (College) will become a concentration within the Bachelor of Science Degree in Electrical Engineering. Effective Fall 2009, students who graduate with a Bachelor of Science Degree in Electrical Engineering with a concentration in Biomedical Engineering will have the notation on their academic record of 'Concentration completed in Biomedical Engineering.'

4. Request to change the requirements in the **Bachelor of Science degree in Electrical Engineering** in the Department of Electrical and Computer Engineering as updated on page 27 of the April 15, 2008 Report of the UCC to the Academic Council.

The concentrations in the Bachelor of Science degree in Electrical Engineering will be noted on the student's academic record when the requirements for the degree have been completed.

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

(1) In item 3. b. change the total credits from '40' to '42' and add the following course:
- EGR 102 Introduction to Engineering Modeling 2

(2) In item 3. d. make the following changes:
- Under **Communications/Signal Processing** add the following course:
  - ECE 442 Introduction to Communication Networks 3
- Add the following new area:
  - **Biomedical Engineering**
  - ECE 445 Biomedical Instrumentation 3
  - ECE 446 Biomedical Signal Processing 3
  - ECE 447 Introduction to Biomedical Imaging 3
  - ECE 448 Modeling and Analysis of Bioelectrical Systems 3

(3) Add the following concentration:

**Concentration in Biomedical Engineering**

The department offers a concentration for students who plan to pursue graduate work in biomedical areas or seek employment in selected medical-related areas. The concentration is available to, but not required of, any student enrolled in the Bachelor of Science degree program in Electrical Engineering. Courses completed to satisfy requirement 3. above may also be used to satisfy the requirements of the concentration. The concentration will be noted on the student's transcript.

**Biomedical Engineering**

To earn a Bachelor of Science degree in Electrical Engineering with a biomedical engineering concentration, students must complete requirements 1., 2., and 3. above and the following:

**CREDITS**

1. Complete 6 credits from the following courses:
   - ANTR 350 Human Gross Anatomy and Structural Biology 3
   - BS 111 Cells and Molecules 3
   - PSL 250 Introductory Physiology 4
   - PSL 431 Human Physiology I 3
   - PSL 432 Human Physiology II 3

2. Complete 6 credits from the following courses:
   - ECE 445 Biomedical Instrumentation 3
   - ECE 446 Biomedical Signal Processing 3
   - ECE 447 Introduction to Biomedical Imaging 3
   - ECE 448 Modeling and Analysis of Bioelectrical Systems 3

3. Complete 3 credits from the following:
   - ME 494 Biofluid Mechanics and Heat Transfer 3
   - ME 495 Tissue Mechanics 3
   - MSE 425 Biomaterials and Biocompatibility 3

A 400-level listed above or other approved Electrical and Computer Engineering (ECE) courses with biomedical engineering content as approved by the student's adviser.

The course used to fulfill this requirement may not be used to fulfill concentration requirement 1. or 2.

Effective Fall 2009.
5. Request to establish a Linked Bachelor of Science and Master of Science degree in Engineering Mechanics in the Department of Mechanical Engineering.

Per University policy:

A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

a. Add the following statement to the Department of Mechanical Engineering:

**LINKED BACHELOR'S-MASTER'S DEGREE IN ENGINEERING MECHANICS**

**Bachelor of Science Degree in Mechanical Engineering with a concentration in Engineering Mechanics**

The department welcomes applications from Michigan State University Mechanical Engineering undergraduate students in their junior and senior year, who are pursuing an engineering mechanics concentration within the Bachelor of Science degree in Mechanical Engineering. Admission applications must be made during the prior Spring semester for an anticipated Spring graduation or the prior Fall semester for an anticipated Fall graduation to allow admission before the final semester as a Mechanical Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.50 and an approved program of study for the Master of Science degree in Engineering Mechanics at the time of admission. Admission to the Linked Bachelor's-Master's Program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

Effective Fall 2009.

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**PART II - NEW COURSES AND CHANGES – continued - 13**

March 26, 2009

**BE 230 Engineering Analysis of Biological Systems**

*Spring of every year. 3(3-0) P: (MTH 132 or MTH 152H or LBS 118) and (BS 110 or concurrently)
P: (MTH 132 or MTH 152H or LB 118) and ((BS 110 or concurrently) or (BS 148H or concurrently) or (LB 144 or concurrently)) and (EGR 102 or concurrently))


Effective Fall 2005 Effective Spring 2009

**BE 332 Engineering Properties of Biological Materials**

*Fall of every year. 3(3-0) P: (BS 111 or PLB 105 or MMG 201) and CE 221 P: (BE 101 or concurrently) and (BS 111 or BS 149H or LB 145) and CE 221 R: Open to juniors or seniors in the Department of Biosystems and Agricultural Engineering. C: BE 333 concurrently.

Physical, thermal, and electromagnetic properties of biological materials necessary for the design and analysis of processes and equipment in biosystems.

Effective Fall 2006 Effective Spring 2009

**BE 333 Biosystems Engineering Laboratory**

*Fall of every year. 1(0-3) P: BS 110 or BS 111 or PLB 105 or ENT 205 or MMG 201 or MMG 301 or PSL 250 or ZEL 141 P: (BE 101 or concurrently) and (BS 111 or BS 149H or LB 145) R: Open only to students in the Biosystems Engineering major. R: Open to juniors or seniors in the Department of Biosystems and Agricultural Engineering.

Measurement of physical, chemical, and biological parameters. Properties that characterize engineered biosystems. Data collection and analysis. Experiment design.

Effective Summer 2005 Effective Spring 2009

**BE 350 Heat and Mass Transfer in Biosystems**

*Spring of every year. 3(3-0) P: (MTH 235 or MTH 255H or LBS 220) and CSE 131 and ((CE 321 or concurrently) or (CHE 311 or concurrently) or (ME 332 or concurrently) or (CE 321 or concurrently))

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or (CHE 311 or concurrently) or (CEM 143 or concurrently) P: (BE 101 or concurrently) and (MTH 235 or MTH 255H or LB 220) and ((CE 321 or concurrently) or (CHE 311 or concurrently) or (ME 332 or concurrently)) and ((CEM 143 or concurrently) or (CEM 251 or concurrently)) R: Open only to students in the College of Engineering. Not open to students with credit in ME 410.


Effective Fall 2005 Effective Spring 2009

BE 351 Thermodynamics for Biological Engineering
Fall of every year. 3(3-0) P: (MTH 235 or MTH 255H or MTH 340 or LB 220) and (BS 111 or LB 145 or MMB 201 or PLB 105) P: (BE 101 or concurrently) and (MTH 235 or MTH 255H or LB 220) and (BS 111 or BS 149H or LB 145) R: Open to juniors or seniors in the College of Engineering. Not open to students with credit in CHE 321 or ME 201.


Effective Summer 2009 Effective Spring 2009

BE 360 Microbial Systems Engineering
Spring of every year. 3(3-0) P: (BE 230 or concurrently) and (BS 111 or LB 145) and MTH 235 P: (BE 230 or concurrently) and (BS 111 or BS 149H or LB 145) and MTH 235 R: Open to juniors or seniors in the College of Engineering.

Application of engineering and biological principles to the analysis of microbial systems. Kinetic analyses and modeling of microbial growth, survival, and inactivation for engineering applications.

Effective Spring 2009

BE 365 Engineering Design and Optimization for Biological Systems
Spring of every year. 3(2-2) P: (BE 101 and (BE 230 or concurrently)) and (MTH 235 or MTH 255H or LB 220) and (BS 111 or LB 145) P: (BE 101 and (BE 230 or concurrently)) and (MTH 235 or MTH 255H or LB 220) and (BS 111 or BS 149H or LB 145) R: Open to juniors or seniors in the College of Engineering.

Design and optimization techniques applied to engineering problems with biological constraints. Project management. Engineering economics. Linear programming.

SA: BE 431
Effective Spring 2009

BE 478 Food Engineering: Solids
Spring of every year. 3(2-2) P: BE 350 and BE 351 P: BE 350 and BE 351 and BE 360 Analysis and design of unit operations and complete systems for handling, processing, and manufacturing bulk, granular, and solid food products. Material variability and microbial, chemical, and physical hazards.

Effective Spring 2005 Effective Spring 2009

BE 481 Land and Water Conservation Engineering
Fall of every year. 3(2-2) P: CSE 131 and (CE 321 or CHE 311) and (BE 351 or concurrently) P: (CE 321 or CHE 311 or ME 332) and (BE 351 or concurrently)


SA: AE 481
Effective Fall 2005 Effective Spring 2009

BE 482 Non-point Source Pollution Control
Spring of every year. 3(2-2) P: (BE 481 or CE 421) and BE 350 P: (BE 481 or CE 421) and BE 350 and BE 360 Identification, estimation, and control of non-point source pollution from agricultural and urban sources. Geographic Information Systems (GIS) based computer models of watersheds. Engineering design of practices and structures to control non-point source pollution. Development of watershed management plans.

Effective Fall 2005 Effective Spring 2009

Final report for EGR issues processed in UCC 08-09 AY
BE 485 Biosystems Design Techniques  
Fall of every year. 3(2-2) P: BE 130 and BE 332 and BE 333 and BE 350 and BE 351 and (BE 431 or concurrently) and (STT 351 or concurrently) P: BE 332 and BE 333 and BE 350 and BE 351 and BE 360 and BE 385 and (STT 351 or concurrently) R: Open to juniors or seniors in the Biosystems Engineering major.  
Engineering design process. Problem identification, analysis, design, modeling, materials, cost estimation, and final specifications. Safety, environmental, and ethical considerations.  
SA: BE 485  
Effective Summer 2006 Effective Spring 2009

COLLEGE OF ENGINEERING
CHE 201 Material and Energy Balances  
Fall of every year. Spring of every year. 3(4-0) P: (MTH 133 or LB 119) and (CEM 142 or CEM 143 or CEM 152 or LB 172) and ((CSE 131 or concurrently) or (CSE 231 or concurrently) or (EGR 102 or concurrently)) P: (MTH 133 or LB 119) and (CEM 142 or CEM 152 or LB 172) and ((CSE 131 or concurrently) or (CSE 231 or concurrently) or (EGR 102 or concurrently))  
Chemical engineering calculations. Synthesis of chemical process systems. Analysis of chemical processes using material and energy balances. Enthalpy calculations for changes in temperature, phase transitions, and chemical reactions.  
Effective Fall 2008

--- NOTE --- Hereafter, the first instance of a detail is the old version, which is being replaced by the second instance (following the use of light font for the text that is being replaced, above)

CHE 210 Modeling and Analysis of Transport Phenomena  
Fall of every year. Spring of every year. 3(3-0) P: ((MTH 235 or concurrently) or LB 119) and CHE 201 P: ((MTH 235 or concurrently) or LB 119) and ((CSE 131 or concurrently) or (EGR 102 or concurrently) or (CSE 231 or concurrently)) and CHE 201  
Steady and unsteady state material and energy balances. Fluxes and rate processes.  
Application of computational methods to problem solutions.  
Effective Fall 2008 Effective Spring 2009

CHE 432 Process Analysis and Control  
Fall of every year. Spring of every year. 3(3-0) P: CHE 431 R: Open to juniors or seniors in the College of Engineering.  
Effective Summer 2006 Effective Spring 2009

MSE 250 Materials Science and Engineering  
Fall of every year. Spring of every year. Summer of every year. 3(2-2) 3(2-3) P: CEM 141 or CEM 151 or LBS 171 P: CEM 141 or CEM 151 or LB 171  
Structure of metals, ceramics and polymers. Phase diagrams, thermomechanical treatments, physical and mechanical properties, diffusion, microstructure studies, environmental effects.  
SA: MSM 250  
Effective Fall 2003 Effective Fall 2009

CE 221 Statics  
Fall of every year. Spring of every year. Summer of every year. 3(2-2) Interdepartmental with Mechanical Engineering. P: (PHY 183 or PHY 183B or PHY 193H) and ((MTH 234 or concurrently) or (LB 220 or concurrently) or (MTH 254H or concurrently)) P: ((PHY 183 or PHY 183B or PHY 193H) or (PHY 231 and PHY 233B)) and ((MTH 234 or concurrently) or (LB 220 or concurrently) or (MTH 254H or concurrently))  
SA: MSM 205  
Effective Fall 2008 Effective Summer 2009
CE 305 Introduction to Structural Analysis and Design
Fall of every year. Spring of every year. 4(3-2) P: (ME 222 and CE 271 or concurrently) R: Open to juniors or seniors in the Department of Civil and Environmental Engineering.
Effective Fall 2006 Effective Fall 2009

CE 400 Structural Mechanics
Fall of every year. Spring of every year. 3(3-0) P: CE 305 R: Open to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or in the College of Engineering.
Effective Spring 2003 Effective Fall 2009

CE 418 Geotechnical Engineering
Fall of every year. Spring of every year. 3(3-0) P: CE 312 R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering. R: Open to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or in the College of Engineering.
Effective Summer 2004 Effective Fall 2009

CE 431 Pavement Design and Analysis I
Fall of every year. 3(3-0) P: CE 312 and CE 337 P: CE 337 R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering. R: Open to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or in the College of Engineering.
Effective Fall 2004 Effective Fall 2009

CE 432 Pavement Rehabilitation
Spring of every year. 3(3-0) P: CE 312 and CE 337 P: CE 337 RB: CE 431 R: Open only to seniors or graduate students in the Department of Civil and Environmental Engineering. R: Open to seniors or graduate students in the Department of Civil and Environmental Engineering or in the College of Engineering.
Engineering concepts and information needed to rehabilitate pavements. Network and project survey and evaluation: design of rigid and flexible overlays, other methods of rehabilitation, selection of rehabilitation alternatives. Initial and life cycle cost analysis of various rehabilitation alternatives.
Effective Summer 2000 Effective Spring 2010

CE 449 Highway Design
Fall of every year. Spring of every year. 3(3-0) P: CE 341 R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering. R: Open to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or in the College of Engineering.
Geometric design of highways. Operation, capacity, safety, and geometric features. Alignment, drainage and pavement design. Use of CAD systems in preparing contract plans.
Effective Summer 2004 Effective Fall 2009

CE 461 Computational Methods in Civil Engineering
Fall of every year. Spring of every year. 3(3-2) P: CSE 131 and CE 221 and MTH 235 P: (CSE 131 or EGR 102) and (CE 221 and MTH 235) R: Open to juniors or seniors or graduate students in
the Civil Engineering major. Not open to students with credit in ME 361.
Theoretical, numerical, and computational methods for civil engineering problems.
Physical modeling, numerical techniques, and programming methods. Focus on civil engineering dynamics, solving systems of differential equations, and visualizing the results.
SA: CE 390
Effective Fall 2007 Effective Spring 2010

CE 471 Construction Engineering - Equipment, Methods and Planning
Spring of every year. 3(3-0) P: (CE 305 and CE 312 and CE 337) or (BCM 305 and BCM 322) P:
(CE 305 and CE 312 and CE 337) or (CMP 305 and CMP 322) R: Open only to juniors or seniors
or graduate students in the Department of Civil and Environmental Engineering and the Building
Construction Management program. R: Open to juniors or seniors or graduate students in the
Department of Civil and Environmental Engineering or in the College of Engineering or in the
Department of Management or in the Environmental Engineering major or in the Construction
Management major.
Engineering and construction fundamentals of earthwork operations, moving of materials,
concrete construction, formwork, false work, and other temporary structures. Relationship
to a construction project’s constructability, cost, and schedule. Engineering and
construction fundamentals of earthwork operations, moving of materials, concrete
construction, formwork, false work, and other temporary structures. Relationship to a
construction project’s constructability, cost, and schedule.
Effective Summer 2005 Effective Spring 2010

CE 481 Environmental Chemistry: Equilibrium Concepts
Fall of every year. 3(3-0) Interdepartmental with Environmental Engineering. P: {CEM 151 and
CEM 152) or (CEM 181H and CEM 182H) or (LB 171 and LB 172)} and (CEM 251 or CEM 351) P:
(CEM 141 and CEM 142) or (CEM 151 and CEM 152) or (CEM 181H and CEM 182H) or (LB 171
and LB 172)
Chemistry of natural environmental systems and pollutants. Equilibrium concepts and
calculations for acid-base, solubility, complexation, redox and phase partitioning reactions
and processes. Applications to ecosystem analysis, pollutant fate and transport, and
environmental protection.
Effective Fall 2009

CE 487 Microbiology for Environmental Science and Engineering
Spring of every year. 3(3-0) Interdepartmental with Environmental Engineering. P: CE 280
Fundamentals of microbiology. Application of these concepts to environmental processes
such as wastewater treatment, human health and bioremediation.
Effective Summer 2009 Effective Fall 2009

CE 863 Applied Numerical Methods for Civil & Environmental Engineers
Spring of every year. Not open to students with credit in ENE 801.
NEW Introduce applied numerical methods for computation, visualization and programming
tasks in civil and environmental engineering.
Effective Spring 2009

CE 880 Civil Engineering Seminar
Fall of every year. Spring of every year. 1(1-0) A student may earn a maximum of 2 credits in all
enrollments for this course. RB: Graduate student status or undergraduate at senior level with a
GPA of 3.0 or higher
NEW Current research in civil engineering. MS students will enroll for this course once. PhD
students will enroll for this course twice during their programs.
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 2009

CSE 320 Computer Organization and Architecture
Fall of every year. Spring of every year. 3(3-0) P: CSE 232 and CSE 260 R: Open to
undergraduate students in the Department of Computer Science and Engineering or in the Lyman
Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science major. Not
open to students with credit in ECE 331.
Boolean algebra and digital logic. Combinational and sequential circuits. Representations
of data and instructions. Architecture and major components of computer systems.
Assembly language programming and interfacing to high level languages. Assembler and
linker processing.
SA: CPS 320
Effective Fall 2004 Effective Fall 2008

CSE 473 Fundamentals of 3D Game Development
Fall of every year. 3(3-0) P: MTH 234 and (CSE 320 or CSE 331 or CSE 335) R: Open to juniors or
seniors or graduate 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.
NEW 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 Fall 2009

CSE 914 Formal Methods in Software Development
Selected Topics in Formal Methods in Software Development
Fall of every year. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this
course, P: CSE 814 RB: Undergraduate courses in software engineering and in logic. R: Open only
to students in the Department of Computer Science and Engineering. R: Open to graduate
students in the Department of Computer Science and Engineering.
Current research in selected areas of software engineering such as: approaches for the
incorporation of formal methods in software development; current projects using formal
methods in software engineering; object-oriented analysis and development techniques;
and approaches for the incorporation of user-interface analysis and design in software
development.
SA: CPS 914
Effective Fall 2002 Effective Summer 2010

ME 892 Mechanical Engineering Seminar
Fall of every year. Spring of every year. 1(1-0)
Attend and present seminars in order to develop research and presentation skills relevant
to mechanical engineering.
Request the use of the Pass-No Grade (P-N) system.
Effective Fall 2008 Effective Fall 2009

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 7
April 21, 2009

COLLEGE OF ENGINEERING
1. Request to change the requirements in the Bachelor of Science degree in Chemical Engineering in the
Department of Chemical Engineering and Materials Science as updated on pages 10 and 11 of the March
The concentrations in the Bachelor of Science degree in Chemical Engineering will be 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 Chemical
Engineering make the following changes:
(1) In item 3. a. make the following changes:
(a) Change the total credits from ‘61’ to ‘58’.
(b) Delete the following course:
CEM 391 Molecular Thermodynamics 3
(2) Reletter item 3. d. to item 3. e.
(3) Add the following item 3. d.:
One of the following courses: 3
CEM 483 Quantum Chemistry 3
CEM 484 Molecular Thermodynamics 3
b. Under the heading Concentrations in Chemical Engineering make the following changes:
(1) In the Biochemical Engineering concentration, modify the introductory statement to the following:
To earn a Bachelor of Science degree in Chemical Engineering with a biochemical engineering concentration, students must complete requirements 1., 2., 3.a., and 3.e. above and the following:
(2) In the Biomedical Engineering concentration delete the following course:
BME 401 Quantitative Human Biology 3
Add the following course:
ZOL 341 Fundamental Biochemistry 4
Modify the introductory statement to the following:
To earn a Bachelor of Science degree in Chemical Engineering with a biomedical engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., 3.d., and 3.e. above and the following:
(3) In the Environmental concentration delete the following courses:
ESA 201 Environmental and Natural Resources 3
NSC 448 Ecology, Law and Economics 3
Add the following course:
ESA 200 Introduction to Environmental Studies and Agriscience 3
Modify the introductory statement to the following:
To earn a Bachelor of Science degree in Chemical Engineering with an environmental concentration, students must complete requirements 1., 2., 3.a., 3.b., 3.d., and 3.e. above and the following:
(4) In the Food Science concentration delete the following course:
FSC 421 Food Law and Regulations 3
Modify the introductory statement to the following:
To earn a Bachelor of Science degree in Chemical Engineering with a food science concentration, students must complete requirements 1., 2., 3.a., 3.b., 3.c., 3.d., and 3.e. above and the following:
(5) In the Polymer Science and Engineering concentration, modify the introductory statement to the following:
To earn a Bachelor of Science degree in Chemical Engineering with a polymer science and engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., 3.d., and 3.e. above and the following:
(6) Add the following concentration:
Bioenergy
To earn a Bachelor of Science degree in Chemical Engineering with a bioenergy concentration, students must complete requirements 1., 2., 3.a., 3.b., 3.d., and 3.e. above and the following:
All of the following courses: 12
BE 469 Sustainable Bioenergy Systems 3
CHE 468 Biomass Conversion Engineering 3
CHE 481 Chemical Engineering 3
CSS 467 Bioenergy Feedstock Production 3
One of the following courses: 3 or 4
AEC 829 The Economics of Environmental Resources 3
CHE 882 Advanced Biochemical Engineering 3
CHE 883 Multidisciplinary Bioprocessing Laboratory 3
MRC 471 Applied Geophysics 4
MC 450 International Environmental Law and Policy 3
MMG 445 Microbial Biotechnology 3
Effective Fall 2009.

PART II - NEW COURSES AND CHANGES – continued - 12
April 21, 2009

COLLEGE OF ENGINEERING
CHE 468 Biomass conversion engineering
Fall of every year. 3(3-0) Interdepartmental with Biosystems Engineering. P: (BE 351 or CHE 321) and (BE 360 or CHE 431)
NEW Physicochemical and biological pretreatment. Biomass conversion to alcohols, biodiesel,
bio-oil, syngas, and other value-added products using advanced biological, chemical, and thermochemical treatments.
Effective Fall 2009

CHE 972 Viscoelasticity and Flow of Polymeric Materials
Spring of odd years, 3(3-0)
Time dependent and steady flow properties of polymeric materials related to molecular and structural parameters. Examples of polymeric blends and composites with thermoplastic and thermoset components.
DELETE COURSE
Effective Spring 2009