Dean Satish Udpa  
College of Engineering  
May 9, 2011

Re: Final report of EGR items processed on UCC

The attached pages are an extract of agenda items processed through the University Curriculum Committee; all were approved except for some courses in the April meeting that are connected with a change in the CEE program, and are deferred until issues with the STT department are resolved. There were many housekeeping changes to existing courses and programs, mostly reflecting the establishment of BS 161 to replace BS 110 and 111, and establishment of the Environmental Engineering program and associated ripple effects in the Civil Engineering program.

A summary of this activity is below, with the details following on subsequent pages (deleted text is gray).

Establishment of Environmental Engineering Program
Significant changes to the Civil Engineering program
Minor program changes (housekeeping) to BE, MSE and ChE programs
Linked BS/MS programs were established in ECE and CSE

1 Graduate course was reinstated (CHE 972)
8 new courses introduced (CE272, 890, ENE 890, ECE819, 849, 866, 869, EGR 891)
35 courses changed (21 related to establishment ENE program and ripples in CE)
1 deleted course (BE333)

Sincerely,

Thomas R Bieler
Professor, Chemical Engineering and Materials Science
Email: bieler@egr.msu.edu  517 353-9767

cc: Pam Cosner, Jamie Ramos, Tom Wolff, Rich Enbody
CHE 972 Viscoelasticity and Flow of Polymeric Materials
Spring of odd years, 3(3-0)
REINSTATEMENT 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.
Effective Spring 2011

October 14, 2010

COLLEGE OF ENGINEERING
1. Request to change the requirements in the Bachelor of Science degree in Materials Science and Engineering in the Department of Chemical Engineering and Materials.
The concentrations in the Bachelor of Science degree in Materials Science and Engineering 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 Materials Science and Engineering make the following changes:
   (1) in item 1., paragraph two, delete Materials Science and Engineering 465.
b. Under the heading Concentrations in Materials Science and Engineering make the following changes:
   (1) Under Manufacturing Engineering in item 2. delete the following course:
   STT 471 Statistics for Quality and Productivity 3
   (2) Under Metallurgical Engineering make the following changes:
   (a) Delete item 2.
   (b) Add the following course to item 1.:
   MSE 426 Introduction to Composite Materials 3
   (c) Change the credits in item 1. From ‘12’ to ‘15’.
   (3) Under Polymeric Engineering make the following changes:
   (a) Delete the following course:
   STT 471 Statistics for Quality and Productivity 3
   (b) Change the total credits from ‘18’ to ‘15’.
Effective Spring 2011.

November 11, 2010

CE 272 Civil and Environmental Engineering Analysis
Fall of every year. Spring of every year, 3(3-0) Interdepartmental with Environmental Engineering,
P: ((MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)) and (CE
271 or concurrently)
NEW Basic operations in AutoCAD. Concepts in probability and statistics including descriptive
statistics, probability distributions, two- and more-sample comparisons, and linear
regression. Concepts in engineering economics including interest, net present worth,
benefit-cost analysis, comparison of economic alternatives, and life-cycle costing.
Restricted to applications in civil and environmental engineering.
Effective Fall 2011

CE 305 Introduction to Structural Analysis and Design
Introduction to Structural Analysis
Fall of every year. Spring of every year, 4(3-3) P: ME 222 and CE 271 or concurrently.
P: ME 222 and (CE 271 or concurrently) and (CE 272 or concurrently) R: Open to juniors or seniors in
the Department of Civil and Environmental Engineering.
Analysis and design of structural systems. Load estimation and placement. Structural
analysis theory. Manual and computer analysis methods and validation of results.

Effective Fall 2009: Effective Fall 2011

CE 312 Soil Mechanics
Fall of every year. Spring of every year. 4(3-3) P: ME 222 and (CE 271 or concurrently) P: ME 222 and (CE 271 or concurrently) and (CE 272 or concurrently) R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Open only to juniors or seniors in the Biosystems Engineering major. R: Open to juniors or seniors in the Department of Civil and Environmental Engineering and open to juniors or seniors in the Biosystems Engineering major.


Effective Summer 2009: Effective Fall 2011

CE 337 Civil Engineering Materials I
Fall of every year. Spring of every year. 4(3-3) P: ME 222 or concurrently) and (CE 271 or concurrently) and (CE 272 or concurrently) R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering.

Common civil engineering construction and paving materials: aggregates, inorganic cements, asphalts, concretes, wood, and steel. Composition, structure, physical and mechanical properties, tests, and production mix design.

Effective Summer 2009: Effective Fall 2011

CE 341 Transportation Engineering
Fall of every year. Spring of every year. 3(3-0) P: (MTH 234 or concurrently) or (MTH 254H or concurrently) or (LB 220 or concurrently) and (CE 271 or concurrently) and completion of Tier I writing requirement. P: (MTH 234 or concurrently) or (MTH 254H or concurrently) or (LB 220 or concurrently) and (CE 272 or concurrently) and completion of Tier I writing requirement. R: Open to juniors or seniors in the Department of Civil and Environmental Engineering or in the Urban and Regional Planning major.

Overview of transportation system issues and problems. Fundamentals of highway design and operations. Planning and evaluation of transportation system alternatives.

SA: CE 346
Effective Fall 2009: Effective Fall 2011

ECE 885 Artificial Neural Networks
Fall of every year. Spring of every year. 3(0-0) Interdepartmental with Computer Science and Engineering.


SA: EE 885
Effective Summer 1999: Effective Fall 2011

January 20, 2011

1. Request to establish a Linked Bachelor of Science Degree in Computer Engineering and Master of
Science Degree in Computer Science in the Department of Computer Science and Engineering. The University Committee on Academic Policy (UCAP) recommended approval of this request at its November 18, 2010 meeting. The University Graduate Council (UGC) recommended approval of this request at its November 8, 2010 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 Computer Science and Engineering and the Department of Electrical and Computer Engineering:
LINKED BACHELOR’S-MASTER’S DEGREE IN COMPUTER SCIENCE
Bachelor of Science Degree in Computer Engineering
Master of Science Degree in Computer Science
The department welcomes applications from Michigan State University Computer 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 Computer Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.5 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 Summer 2011.

2. Request to establish a Linked Bachelor of Science Degree in Computer Engineering and Master of Science Degree in Electrical Engineering in the Department of Electrical and Computer Engineering. The University Committee on Academic Policy (UCAP) recommended approval of this request at its November 18, 2010 meeting. The University Graduate Council (UGC) recommended approval of this request at its November 8, 2010 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 Electrical and Computer Engineering:
LINKED BACHELOR’S-MASTER’S DEGREE IN ELECTRICAL ENGINEERING
Bachelor of Science Degree in Computer Engineering
Master of Science Degree in Electrical Engineering
The department welcomes applications from Michigan State University Computer 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 Computer Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.5 and an approved program of study for the Master of Science degree in Electrical 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 Summer 2011.

ECE 819 Smart Material Sensors and Actuators
Fall of odd years. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. RB: General background in mechanics, dynamics, and control systems at the undergraduate level is desirable although not required.
Effective Fall 2011

ECE 849 Digital Image Processing
Spring of even years. 3(3-0) RB: (ECE 466) or Equivalent
NEW Fundamentals of vision and image formation, various image transforms, linear and nonlinear techniques for image enhancement, image restoration and deconvolution, introduction to wavelet transforms and multi-resolution image processing techniques, morphological image processing, homomorphic filters. Image representation and analysis techniques, application to biomedical images.
Request the use of ET-Extension to postpone grading.
Effective Spring 2012

ECE 866 Time-Frequency and Wavelet Analysis
Spring of even years. 3(3-0) RB: (ECE 466) or Equivalent
Effective Spring 2012

ECE 869 Wireless Communications and Networking
Fall of even years. 3(3-0) RB: (ECE 457) or Equivalent
NEW Cellular system design, characterization of wireless channels, signaling and receiver design for mobile radio, multiple access techniques and mobility management.
Effective Fall 2012

February 17, 2011

MSE 451 Microscopic and Diffraction Analysis of Materials
Spectroscopic and diffraction analysis of materials
Fall of every year. 3(2-3) P: PHY 184 or PHY 184B or PHY 234B RB: MSE 350 and MSE 381 RB: (MSE 350 and MSE 381) and MSE 350 and MSE 381 R: Open only to juniors or seniors or graduate students in the Colleges of Engineering or Natural Science. R: Open to juniors or seniors or graduate students in the College of Engineering or in the College of Natural Science. General properties, generation, and detection of x-rays. Interaction with solids. Crystallography, reciprocal lattice, diffraction analysis, and techniques. Single crystal methods. Stereographic projection. X-ray microanalysis. General properties, generation, and detection of x-rays interaction with solids. Crystallography, reciprocal space, diffraction analysis, and techniques. Single crystal methods. Stereographic projection. X-ray microanalysis.
March 24, 2011

1. Request to change the requirements in the Bachelor of Science degree in Chemical Engineering in the Department of Chemical Engineering and Materials Science. 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. delete the following course:
          BS 111 Cells and Molecules 3
      Add the following course:
          BS 161 Cell and Molecular Biology 3
   b. Under the heading Concentrations in Chemical Engineering make the following changes:
      (1) In the Environmental concentration make the following changes:
          (a) Change 'CE 280' to 'ENE 280'.
          (b) Change 'CE 481' to 'ENE 481'.

PART I - NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES – continued - 3
March 24, 2011
(c) Change 'CE 483' to 'ENE 483'.
Effective Fall 2011.

2. Request to change the requirements for the Bachelor of Science degree in Civil Engineering in the Department of Civil and Environmental Engineering.
   a. Under the heading Requirements for the Bachelor of Science Degree in Civil Engineering make the following changes:
      (1) In item 1., paragraph two, delete sentence two.
      (2) In item 3. a. make the following changes:
          (a) Change the total credits from '40' to '43'.
          (b) Delete the following courses:
              CE 280 Principles of Environmental Engineering and Science 3
              CE 305 Introduction to Structural Analysis and Design 4
              CE 495 Senior Design in Civil Engineering 3
              STT 351 Probability and Statistics for Engineering 3
      Add the following courses:
      CE 272 Civil and Environmental Engineering Analysis 3
      CE 305 Introduction to Structural Analysis 3
      CE 495 Senior Design in Civil and Environmental Engineering
Engineering 4  
ENE 280 Principles of Environmental Engineering and Science 3  
GLG 301 Geology of the Great Lakes Region 3  
(c) Delete the note following the list of courses.  
(3) In item 3. c. delete the note following the list of courses.  
(4) In item 3. d. Environmental Track make the following changes:  
(a) In item 1. change ‘CE 481 and 483’ to ‘ENE 481 and 483’.  
(b) In item 2. change ‘CE 421 and 487’ to ‘ENE 421 and 487’ and add the following course:  
ENE 489 Air Pollution: Science and Engineering 3  
(5) In item 3. d. Water Resources Track make the following changes:  
(a) In item 1. change ‘CE 421 and 422’ to ‘ENE 421 and 422’.  
(b) In item 2. change ‘CE 822’ to ‘ENE 822’ and delete the following course:  
CE 423 Applied Hydrologic Analysis and Design 3  
(6) Delete the Environmental Engineering Concentration.  

Effective Fall 2011  

BE 230 Engineering Analysis of Biological Systems  
Spring of every year. 3(3-0) 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 (CE 102 or concurrently) P: MTH 132 or MTH 152H or LB 118 and ((BS 162 or concurrently) or (BS 182H or concurrently) or (LB 144 or concurrently)) and (EGR 102 or concurrently)  

Effective Spring 2009 Effective Fall 2011  

BE 332 Engineering Properties of Biological Materials  
Fall of every year. 3(3-0) P: (BE 101 or concurrently) and (BS 110 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 Spring 2009 Effective Fall 2011  

BE 333 Biosystems Engineering Laboratory  
Fall of every year. 1(0-3) P: (BE 101 or concurrently) and (BS 110 or BS 149H or LB 145) 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.  
DELETE COURSE  
Effective Fall 2011  

BE 351 Thermodynamics for Biological Engineering  
Fall of every year. 3(3-0) P: (BS 101 or concurrently) and (MTH 235 or MTH 255H or LB 220) and (BS 110 or BS 149H or LB 145) P: (BE 101 or concurrently) and (MTH 235 or MTH 255H or LB 220) and (BS 161 or BS 181H 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 Spring 2009 Effective Fall 2011  

BE 445 Biosensors for Medical Diagnostics  
Spring of every year. 3(3-0) P: (BS 110 or CEM 141 or CEM 151) and (BS 149H or LB 145) and (CE 302 or CECE 302 or ECE 305 or ECE 461) P: (BS 161 or BS 181H or LB 145) and (CEM 141 or CEM 151) and (ECE 302 or ECE 461)
345 or BE 333) RB: Biology, chemistry, and electronics R: Open to juniors or seniors or graduate students in the College of Engineering. Not open to students with credit in BE 845.
Biosensors, their components, properties, and associated electronics for applications in medical diagnostics.
Effective Fall 2011

BE 481 Land and Water Conservation Engineering
Water Resources Systems Analysis and Modeling
Fall of every year. 3(2-2) Pr: (CE 321 or CHE 311 or ME 332) and (BE 351 or concurrently) Pr: CE 321 or CHE 311 or ME 332 R: Open to juniors or seniors in the College of Engineering.
Hydrology of surface waterbodies, modeling, quantifying, and evaluation, evapotranspiration, drainage design, GIS, Postprocessing Systems, Geographic Information Systems and applications in engineering projects, Irrigation efficiency, Geospatial data collection at watershed scale, Geographical information system application in hydrology and ecosystems engineering, Watershed modeling and applications in engineering design and decision-making.
SA: AE 481
Effective Spring 2009 Effective Summer 2012

BE 482 Non-point Source Pollution Control
Diffuse-Source Pollution Engineering
Spring of every year. 3(2-2) Pr: AE 481 or CE 421 and BE 350 and BE 384 Pr: (BE 350 or CE 483) and (BE 360 or CE 487) R: Open to juniors or seniors in the College of Engineering.
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, Identification, estimation, and control of diffuse source pollution from agricultural and urban sources, Analysis of diffuse source pollutants in biological systems, Engineering design of practices and structures to prevent, mitigate, and treat diffuse source pollution, including low impact development (LID) strategies.
Effective Spring 2009 Effective Summer 2012

BE 485 Biosystems Design Techniques
Fall of every year. 3(2-2)
Pr: CE 332 and BE 333 and BE 360 and BE 351 and BE 360 and BE 385 or approval of department 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 486
Effective Spring 2009 Effective Fall 2011

CE 271 Introduction to Civil Engineering
Introduction to Civil and Environmental Engineering
Fall of every year. Spring of every year. 4(3-3) Pr: (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)
Measurement, analysis and design with applications in civil engineering. Surveying and error analysis.
Effective Spring 2009 Effective Summer 2012

CE 272 Civil and Environmental Engineering Analysis
Fall of every year. Spring of every year. 3(3-0) Interdepartmental with Environmental Engineering.
P: ((MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)) and (CE 271 or concurrently)
NEW Basic operations in AutoCAD. Selected applications of probability and statistics to topics in civil and environmental engineering. Applications of engineering economics including interest, net present worth, benefit-cost analysis, comparison of economic alternatives, and life-cycle costing.
Effective Fall 2011

CE 305 Introduction to Structural Analysis and Design
Introduction to Structural Analysis
Fall of every year. Spring of every year. 4(3-2) 3(3-0) P: (ME 222 and CE 271 or concurrently) P: ME 222 and (CE 271 or concurrently) and (CE 272 or concurrently) R: Open to juniors or seniors in the Department of Civil and Environmental Engineering.


Effective Fall 2009; Effective Summer 2012

CE 312 Soil Mechanics
Fall of every year. Spring of every year. 4(3-3) P: (ME 232 and CE 271 or concurrently) P: (ME 222 and (CE 271 or concurrently)) and (CE 272 or concurrently) R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Open only to juniors or seniors in the Biosystems Engineering major. R: Open to juniors or seniors in the Department of Civil and Environmental Engineering and open to juniors or seniors in the Biosystems Engineering major. Engineering properties of soil and their measurement. Effective-stress concept. Permeability and seepage. Compaction. Consolidation, shear strength, and stress-strain behavior.

Effective Summer 2009; Effective Fall 2011

CE 337 Civil Engineering Materials I
Fall of every year. Spring of every year. 4(3-3) P: (ME 222 or concurrently) and (CE 271 or concurrently) P: (ME 222 or concurrently) and (CE 271 or concurrently) and (CE 272 or concurrently) R: Open to juniors or seniors in the Department of Civil and Environmental Engineering. Common civil engineering construction and paving materials: aggregates, inorganic cements, asphalts, concretes, wood, and steel. Composition, structure, physical and mechanical properties, tests, and production mix design.

Effective Summer 2009; Effective Fall 2011

CE 341 Transportation Engineering
Fall of every year. Spring of every year. 3(3-0) P: (MTH 234 or concurrently) or (MTH 254H or concurrently) or (MTH 256H or concurrently) or (CE 271 or concurrently) and (CE 272 or concurrently) and completion of Tier I writing requirement) P: (MTH 234 or concurrently) or (MTH 254H or concurrently) or (L B 220 or concurrently) and (CE 271 or concurrently) and (CE 272 or concurrently) and completion of Tier I writing requirement) RB: STT 351 R: Open to juniors or seniors in the Department of Civil and Environmental Engineering or in the Urban and Regional Planning major. Overview of transportation system issues and problems. Fundamentals of highway design and operations. Planning and evaluation of transportation system alternatives.

SA: CE 346
Effective Fall 2010; Effective Fall 2011

CE 418 Geotechnical Engineering
Fall of every year. 3(3-0) P: CE 312 P: CE 312 and (GLG 201 or GLG 301) R: Open to juniors or seniors or graduate students in the College of Engineering. Shallow foundation design: bearing capacity, stress distribution, and settlement analysis. Pile foundations. Design of retaining structures, including rigid walls, braced excavations, and sheet-pile walls. Stability of slopes and embankments.

Effective Fall 2009; Effective Fall 2011

CE 448 Transportation Planning
Spring of every year. 3(3-0) P: CE 341 and STT 351 P: CE 341 Transportation planning process and procedures. Estimation of travel demand using traditional models of trip generation, trip distribution, modal split, and traffic assignment. Use of "quick-response" procedures. Traffic impact of new facilities.

Effective Fall 1997; Effective Fall 2011
CE 495  Senior Design in Civil Engineering
Senior Design in Civil & Environmental Engineering
Fall of every year. Spring of every year. 3(1-3) 4(2-3) R: Approval of department.
Effective Fall 2009  Effective Summer 2012

CE 480 Principles of Environmental Engineering and Science
ENE 280 Fall of every year. Spring of every year. 3(3-0) Interdepartmental with Environmental Engineering.
Interdepartmental with Civil Engineering P: CEM 144 or CEM 154 or LB 171 and (MATH 132 or concurrent or MATH 1521 or concurrent or LB 118 or concurrent). P: (CEM 141 or CEM 151 or LB 171) and (CEM 141 or CEM 151 or LB 171)
Physical, chemical and biological processes related to environmental science and engineering. Environmental systems analysis with application to air, water and soil. Analysis of environmental problems and development of engineering solutions.
Effective Summer 2009  Effective Summer 2012

CE 421 Engineering Hydrology
ENE 421 Fall of every year. 3(2-2) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: CE 321 P: CE 321 and (GLG 201 or GLG 301) or (STT 351 R: Open to juniors or seniors or graduate students in the College of Engineering or in the College of Natural Science or in the Department of Crop and Soil Sciences.
Hydrologic design of stormwater systems. Equilibrium hydrograph analysis, unit hydrographs, infiltration, hydrograph synthesis, and reservoir routing. Groundwater: Darcy's law, flow nets, well hydraulics, design of capture wells.
Effective Summer 2009  Effective Summer 2012

CE 422 Applied Hydraulics
ENE 422 Spring of every year. 3(2-2) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: CE 321 or ME 332 R: Open to juniors or seniors or graduate students in the College of Engineering.
Effective Fall 2009  Effective Summer 2012

CE 480 Environmental Measurements Laboratory
ENE 480 Fall of every year. 1(0-3) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: CEM 161 or CEM 185H or LB 171L
Basic chemical and microbiological methods used in the analysis of environmental media. Laboratory safety, quality assurance, quality control, and statistics used in laboratory analysis. Related technical communication, laboratory report writing.
Effective Fall 2009  Effective Summer 2012

CE 481 Environmental Chemistry: Equilibrium Concepts
ENE 481 Fall of every year. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering 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  Effective Summer 2012

CE 480 Unit Operations and Processes in Environmental Engineering
ENE 483 Water and Wastewater Engineering
Fall of every year, 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering: CE 280 and (CE 321 or concurrently) P: ENE 280 and (CE 321 or concurrently)
Scientific basis and design of physical, chemical and biological treatment methods for the control of water and air pollution. Operation and process selection.
Effective Fall 2009 Effective Summer 2012

CE 487 Microbiology for Environmental Science and Engineering
ENE 487 Spring of every year. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: CE 280 P: ENE 280
Fundamentals of microbiology. Application of these concepts to environmental processes such as wastewater treatment, human health and bioremediation.
Effective Fall 2009 Effective Summer 2012

CE 821 Groundwater Hydraulics
ENE 821 Fall of every year. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering
Effective Fall 2010 Effective Summer 2012

CE 822 Groundwater Modeling
ENE 822 Spring of even years. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering
Effective Spring 2010 Effective Summer 2012

CE 823 Stochastic Groundwater Modeling
ENE 823 Spring of odd years. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: CE 821 P: ENE 821 RB: Groundwater Hydrology, groundwater modeling
Effective Fall 2010 Effective Summer 2012

CE 829 Mixing and Transport in Surface Waters
ENE 829 Fall of odd years. 3(3-0) Interdepartmental with Environmental Engineering. Interdepartmental with Civil Engineering P: ENE 801
Effective Fall 2009 Effective Summer 2012

ECE 489 Digital Image Processing
Spring of even years. 3(3-0) RB: (ECE 468) or Equivalent
NEW Fundamentals of vision and image formation, various image transforms, linear and nonlinear techniques for image enhancement, image restoration and deconvolution, Introduction to wavelet transforms and multi-resolution image processing techniques, morphological image processing, homomorphic filters, image representation and analysis techniques, application to biomedical images.
Effective Spring 2011

April 19, 2011

1. Request to change the Graduation Requirements for All Majors in the College of Engineering.
a. Under the heading Graduation Requirements for All Majors make the following changes:

UCC Engineering summary 5/9/2011 11
(1) In item 1. a. delete Biological Science 110 and 111 and replace with Biological Science 161.
(2) In item 1. c. delete Biological Science 110 and 111L.
Effective Fall 2011.

2. Request to change the requirements for the Bachelor of Science degree in Biosystems Engineering in the Department of Biosystems and Agricultural Engineering.

The concentrations in the Bachelor of Science degree in Biosystems 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 Biosystems Engineering make the following changes:
(1) In item 3. a. make the following changes:
(a) Change the total credits from ‘51’ to ‘46’.
(b) Delete the following courses:
BE 333 Biosystems Engineering Laboratory 1
BS 110 Organisms and Populations 4
BS 111 Cells and Molecules 3
ECE 345 Electronic Instrumentation and Systems 3
STT 351 Probability and Statistics for Engineering 3
Add the following courses:
BE 334 Biosystems Engineering Laboratory Practice 3
BS 161 Cell and Molecular Biology 3
BS 162 Organismal and Population Biology 3
(2) Add the following new item 3. b.:
b. One of the following courses (2 credits):
BS 171 Cell and Molecular Biology Laboratory 2
BS 172 Organismal and Population Biology Laboratory 2
(3) Reletter the former item 3. b. to 3. c. and add the following courses:
ZOL 341 Fundamental Genetics 4
ZOL 355 Ecology 3
(4) Reletter the former item 3. c. to 3. d. and delete the following course:
CSS 440 Soil Biophysics 3
Add the following courses:
BLD 450 Eukaryotic Pathogens 3
CSS 442 Agricultural Ecology 3
PLB 402 Biology of Fungi 3
PLB 424 Algal Biology 4
(5) Reletter the former item 3. d. to 3. e. and make the following changes:
(a) Change the requirement to ‘Four of the following courses (12 credits)’.
(b) Add the following course:
ECE 445 Biomedical Instrumentation 3
(6) Delete the former item 3. e.

b. Under the heading Concentrations in Biosystems Engineering make the following changes:
(1) In the Bioenergy Engineering concentration make the following changes:
(a) In item 1. delete the following course:
MMG 445 Microbial Biotechnology 3
(b) Add the following new item 2.:
2. One of the following courses (3 or 4 credits):
MMG 445 Microbial Biotechnology (W) 3
PLB 402 Biology of Fungi 3
PLB 424 Algal Biology 4
(c) Renumber the former item 2. to item 3. and delete the following course:
FW 829 The Economics of Environmental Resources 3
Add the following courses:
ME 422 Introduction to Combustion 3
MMG 445 Microbial Biotechnology (W) 3
PLB 402 Biology of Fungi 3
PLB 424 Algal Biology 4
Courses used to fulfill requirement 2. in this concentration may
not be used to fulfill this requirement.
(2) In the Biomedical Engineering concentration make the following changes:
(a) Change item 1. to the following:
1. The following course (3 credits):
BE 445 Biosensors for Medical Diagnostics 3
(b) Add the following new items 2. and 3.:
2. One of the following courses (3 credits):
ECE 445 Biomedical Instrumentation 3
ME 494 Biofluid Mechanics and Heat Transfer 3
3. One of the following courses (3 credits):
BLD 450 Eukaryotic Pathogens 3
PSL 425 Physiological Biophysics 3
(c) Renumber the former item 2. to item 4. and add the following courses:
ECE 445 Biomedical Instrumentation 3
ME 494 Biofluid Mechanics and Heat Transfer 3
PSL 425 Physiological Biophysics 3
Courses used to fulfill requirements 2. and 3. in this concentration
may not be used to fulfill this requirement.
(3) In the Ecosystems Engineering make the following changes:
(a) Replace item 2. with the following:
2. Two of the following courses (5 or 6 credits):
CE 422 Applied Hydraulics 3
CSS 210 Fundamentals of Soil Science 3
CSS 330 Soil Chemistry 2
CSS 360 Soil Biology 3
CSS 442 Agricultural Ecology 3
CSS 455 Pollutants in the Soil Environment 3
FOR 404 Forest Ecology 3
FW 417 Wetland Ecology and Management 3
FW 420 Stream Ecology 3
Effective Fall 2011.

3. Request to establish a Bachelor 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.
   a. Background Information:
The Department of Civil and Environmental Engineering has offered a well-established
concentration in environmental engineering for nearly twenty years through the existent Bachelor of
Science degree in Civil Engineering. The environmental engineering field has matured to the point
where the undergraduate degree is becoming the norm. The American Academy of Environmental
Engineers have developed a body of knowledge appropriate for an undergraduate degree in
environmental engineering. There is clearly a need in the State of Michigan for the degree and
there is renewed interest in and funding for water and wastewater infrastructure and environmental
protection. Michigan State University is a leader in the broadly defined area of environmental
science and engineering. The program will be accredited under the Accreditation Board for
Engineering and Technology (ABET).
   b. Academic Programs Catalog Text:
The environmental engineering major is designed to provide students with the engineering and scientific principles to analyze, design, and manage environmental systems, including water supplies, wastewater treatment facilities, air pollution control systems, surface and groundwater resources, and landfills. The program offers a thorough background in engineering fundamentals, along with a broad understanding of mathematical, physical, chemical, and biological concepts as they relate to environmental engineering.

The Bachelor of Science Degree program in Environmental Engineering is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone 1-410-347-7700.

Requirements for the Bachelor of Science Degree in Environmental Engineering
1. The University requirements for bachelor's degrees as described in the Undergraduate Education section of this catalog; 128 credits, including general elective credits, are required for the Bachelor of Science degree in Environmental Engineering.

The University's Tier II writing requirement for the Environmental Engineering major is met by completing Civil Engineering 321. That course is referenced in item 3. a. below.

Students who are enrolled in the College of Engineering may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading Graduation Requirements for All Majors in the College statement. Certain courses referenced in requirement 3. below may be used to satisfy the alternative track.

2. The requirements of the College of Engineering for the Bachelor of Science degree.

The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.

3. The following requirements for the major.

CREDITS
a. All of the following courses (47 credits):

BS 161 Cell and Molecular Biology 3
BS 162 Organismal and Population Biology 3
CE 221 Statics 3
CE 271 Introduction to Civil and Environmental Engineering 4
CE 272 Civil and Environmental Engineering Analysis 3
CE 321 Introduction to Fluid Mechanics 4
CE 495 Senior Design in Civil and Environmental Engineering 4
CEM 161 Chemistry Laboratory I 1
CHE 201 Materials and Energy Balances 3
ENE 280 Principles of Environmental Engineering and Science 3
ENE 421 Engineering Hydrology 3
ENE 480 Environmental Measurements Laboratory 1
ENE 481 Environmental Chemistry: Equilibrium Concepts 3
ENE 483 Water and Wastewater Engineering 3
ENE 487 Microbiology for Environmental Science and Engineering 3
ENE 489 Air Pollution: Science and Engineering 3

b. One of the following courses (3 or 4 credits):

CHE 321 Thermodynamics for Chemical Engineering 4
ME 201 Thermodynamics 3

c. One of the following courses (3 or 4 credits):

GLG 201 The Dynamic Earth 4
GLG 301 Geology of the Great Lakes Region 3

d. Major Tracks: Complete 12 to 18 credits of electives as specified below.

Geo-environmental Engineering Track
All of the following courses (18 credits):

CE 312 Soil Mechanics 4
CE 337 Civil Engineering Materials I 4
CE 418 Geotechnical Engineering 3
CE 485 Landfill Design 3
ME 222 Mechanics of Deformable Solids 4

Water Resources Track
All of the following courses (13 credits):
ENE 422 Applied Hydraulics 3
GLG 411 Hydrogeology 3
GLG 412 Glacial Geology and the Record of Climate Change 4
GLG 421 Environmental Geochemistry 3

General Track
1. At least one of the following courses (3 to 6 credits):
CE 485 Landfill Design 3
ENE 422 Applied Hydraulics 3

2. Additional credits in technical courses at the 300-level or above
approved by the department to total 12 credits in the track.
Courses selected should provide some focus related to an
application area of environmental engineering.
Effective Fall 2011.

EGR 891 Selected Topics
Fall of every year. Spring of every year. Summer of every year. 1 to 4 credits. A student may earn a
maximum of 9 credits in all enrollments for this course. R: Open to graduate students in the College
of Engineering.
NEW Experimental course development or special topics appropriate for graduate students.
Effective Fall 2011

BE 360 Microbial Systems Engineering
Spring of every year. 3(3-0) P: (BE 236 or concurrently) and (BS 131 or BS 140H or LB 145) and
MTH 235 P: (BE 230 or concurrently) 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 Effective Fall 2011

BE 385 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) R: Open to juniors or seniors in the College of Engineering.
Design and optimization techniques applied to engineering problems with biological
Effective Spring 2009 Effective Fall 2011

CE 890 Independent Study in Civil Engineering
Fall of every year. Spring of every year. Summer of every year. 1 to 4 credits. A student may earn a
maximum of 9 credits in all enrollments for this course. R: Open only to master's students in the
Civil Engineering major. Approval of department. R: Open to graduate students in the Department
of Civil and Environmental Engineering. Approval of department.
Research problems of limited scope not pertaining to thesis accomplished under CE 899
or CE 999.
Effective Summer 1999 Effective Fall 2011

CE 900 Research Strategies and Methods in Civil Engineering
Spring of every year. 1(1-0) R: Open to graduate students in the Department of Civil and
Environmental Engineering. Not open to students with credit in ENE 900.
NEW Criteria for quality research, scientific method, scientific arguments, statistical testing,
critical thinking skills, reviewing journal articles, literature synthesis, writing proposals and

UCC Engineering summary 5/9/2011 15
papers, giving presentations, responsible conduct of research
Effective Spring 2011

ENE 900 Research Strategies and Methods in Environmental Engineering and Science
Spring of every year. 1(1-0) Interdepartmental with Geological Sciences. R: Open to graduate students in the Department of Civil and Environmental Engineering and open to graduate students in the Department of Geological Sciences. Not open to students with credit in CE 900.
NEW Criteria for quality research, scientific method, scientific arguments, statistical testing, critical thinking skills, reviewing journal articles, literature synthesis, writing proposals and papers, giving presentations, responsible conduct of research.
Effective Spring 2011