

COURSE AND CURRICULUM CHANGES

Approved at the faculty meeting

COLLEGE OF ENGINEERING

Undergraduate/Graduate

November 7, 2007

4:00 p.m.

1066 Rathbone

Units that may be directly impacted by these changes have been notified. These are

Departments of:

Division Biology
Dept of Plant Pathology

UNIVERSITY HONORS PROGRAM College of Engineering Requirements

INTRODUCTION

The college of engineering honors program welcomes qualified students to join the honors program at any point in their academic career in which they become academically eligible for admission into the university honors program. The honors program is intended to recognize the high achievements of outstanding students who go beyond the curriculum requirements for a given degree program to meet the challenges of completing advanced study, scholarship, leadership, and citizenship activities.

The information that follows is for discussion only and is limited to the portion of the university honors program requirements for which the College of Engineering will be responsible. When finalized, this will be an internal document to the College of Engineering and will provide guidance to students and faculty in the College as they develop individual programs for completion of the honors requirements.

- I. **College of Engineering Requirements**8 credits or equivalent required
 - A. **Engineering Honors Colloquium DEN399** 1 credit hour
Colloquium available in the Fall and Spring Semesters
 - B. **Honors Project (Required)**3 - 4 credit hours
Capstone research or creative project - including presentation of findings to faculty and/or students. Requires supervision by a faculty mentor.

The remaining 3 to 4 credits or equivalent necessary to complete a total of the 8 required by the College of Engineering may be obtained by completing any combination of the following courses or activities. The activities listed in item D must be approved by the College of Engineering honors coordinator in consultation with the departmental honors advisor and the University Honors Program Director prior to participating in the activity.

- C. **University Honors Courses**.....Up to 4 credit hours
These are in addition to any courses taken for the University Level Requirements listed in the University Honors Program.
- D.* **Leadership/Other Honors Activities**Up to 4 *PDU's
(*PDU: Professional Development Units)

Activities for earning professional development units and the number of PDU's to be earned for each activity must be agreed to by the departmental honors advisor (DHA) prior to participation by the student. An activities plan and a method to determine satisfactory completion of the activity must be presented to and approved by the DHA prior to participation by the honors student.

The activities shown in the following list are only intended as examples of ways by which professional development units may be earned. The professional development units listed for each example are not intended to be absolute. Note that no one activity can be repeated for additional professional development units.

- International Study Abroad or National Student Exchange (3)
- Faculty led study tour (1)
- Summer professional internship (2)
- Semester COOP Experience (3)
- Community Service including that organized by Engineers Without Borders, Kansas State University, etc (1 to 2)
- Submission of a design or written paper or poster for regional and/or national student competition (2). Personally presenting the paper or poster at a national meeting add (1) point. Placing in the top 3 at the national level add (1) point.
- Participation on an engineering sponsored student competition team at the regional or national level (2). If the team leader, add (1) point.
- Student organization leadership position (local chapter president or vice president or equivalent) (1)
- Engineering Ambassador Executive (1)
- Application for Nationally Competitive Scholarship Awards (Rhodes, Marshal, Truman, Goldwater, Udall or equivalent) (2)
- Graduate coursework (1 PDU for each credit hour of 700 level or higher taken for graduate credit)
- Modern Languages (1 PDU for each credit of 200 level or higher of a spoken modern language course or other as approved. Does not include literature or history courses)
- Participation in a formal Learning Community (1)
- Steel Ring

Effective Date: Spring 2008

Architectural Engineering

NEW COURSES

Effective **Spring 2008**

Add: ARE 725. Cold-Formed Steel Design. (V) On sufficient demand. Principles of behavior, design, fabrication, and construction of cold-formed steel structures. Two or three hours rec. a week. Pr.: ARE 524 or CNS 524 or CE 542.

Rationale: The course is needed for the structural engineer as cold-formed steel structures are currently a very popular structural system. It will be taught as an elective course.

Impact: No negative impacts. The course is currently being taught under a topics number. A positive impact is the preparation of the structural designers to utilize cold-formed materials in the structure. No similar courses offered on campus.

Add: ARE 630. Introduction to LEED. (V) On sufficient demand. Introduction to green building design and construction principles and practices based on the Leadership in Energy and Environmental Design (LEED) Green Building Rating System of the United States Green Building Council (USGBC). One or Two hours rec. a week. Pr.: Professional Program standing.

Rationale: LEED awareness and in some cases certification is becoming extremely important to clients of design professionals and constructors. Energy conservation in the manufacture of materials, construction of the projects, and long term operation of the structure is important as well as the use of environmentally friendly materials and methods. It will be taught as an elective course.

Impact: No negative impacts. The course is currently being taught under a topics number. A positive impact is the preparation of graduates in design and construction to become knowledgeable in this important area of our industry. Some will advance to become LEED accredited professionals. No similar course offered on campus.

~~**Add:** ARE 711. Building Energy Codes and Standards. (2) II. Study of the background, importance, impact, and application of the energy codes to the systems design process. Pr.: ARE 540, ARE 532, and ARE 533.~~

~~**Rationale:** Energy codes and their continuous revision process have become extremely important in building design. This topical area is primarily designed for those engineering students who will specialize in either mechanical design or electrical design for buildings.~~

~~**Impact:** No negative impacts. The course has been taught under a topics number. A positive impact is the preparation of the graduates in the knowledge of energy codes and their relationship to overall building design. No similar course offered on campus.~~

Removed from proposal at this time.

Construction Science and Management

NEW COURSES

Effective **Spring 2008**

- Add:** CNS 629. Tilt-up Concrete Structures in Construction Management. (2) On sufficient demand. Basics of concrete, principles of tilt-up concrete, construction operations of tilt-up projects, planning procedures for job site erection, and safety procedures. Two hours rec. a week. Pr.: CNS 320 and CNS 522.
- Rationale:** Tilt-up concrete processes are used more frequently today and is predicted to increase in use during the coming decade. Offered as an elective course.
- Impact:** No negative impacts. The course is currently being taught under a topics number. A positive impact is that students may be certified through a professional examination for the tilt-up process. No similar course offered on campus.
- Add:** CNS 610. Pre-Engineered Metal Buildings. (2) On sufficient demand. Pre-engineered metal building systems: history, components, erection procedures and sequencing, delivery considerations, quality control, safety, and quantity surveying and plan reading. Two hours rec. a week. Pr.: Professional Program standing in Construction Science and Management or Graduate student in Architectural Engineering.
- Rationale:** This course has been taught numerous times and covers a specific area of the industry that impacts projects from small commercial to large manufacturing structures. It is a popular specialized method of construction. This course is designed for those wishing detailed knowledge of this construction system.
- Impact:** No negative impacts. The course is currently being taught under a topics number. A positive impact is the knowledge gained about a popular construction method. No similar course offered on campus.

Architectural Engineering

COURSE REVISIONS

Effective Spring 2008

Title, course description, and prerequisite revisions:

From: ARE 522. Loading and ~~Stability of Structures~~. (2) I, II. Review of ~~code~~ loading requirements, applications, ~~design, and bracing criteria~~ for buildings. Two hours rec. a week. Pr.: CE 533, CE 534, and CNS 210.

To: ARE 522. Loading and Load Paths in Buildings. (2) I, II. Review of International Building Code structural loading requirements, applications, determination of design loads, and establishing correct and continuous load paths for all loads acting on a structure for buildings. Two hours rec. a week. Pr.: CE 533, CE 534, and CNS 200. Pr. or Conc.: CE 537.

Rationale: This course has been taught utilizing the International Building Code in the past. The new description better describes the course and its place in the structural sequence for the Architectural Engineering program. It has been determined from past experience that the student is better able to understand the materials if CE 537, Introduction to Structural Analysis, is required as a pre-requisite or concurrent course. CNS 200 replaced CNS 210 in the program 3 years ago.

Impact: No impact. Only Architectural Engineering students are enrolled in this course, therefore, no revisions of student schedules will be impacted.

From: ARE 734. ~~Building Thermal~~ Systems Design. (3) II. Design and specifications of selected thermal and mechanical systems for structures. The course uses all the modern techniques of thermal/mechanical system design for buildings. ~~Students are required to develop term research design projects~~. Two hours rec. and three hours lab a week. Pr.: ARE 640.

To: ARE 734. Advanced Mechanical Systems Design. (3) II. Design and specifications of selected thermal and mechanical systems for structures. The course uses all the modern techniques of thermal/mechanical system design for buildings. Two hours rec. and three hours lab a week. Pr.: ARE 540.

Rationale: Students have confused the course name with ARE 534, Thermal Systems Design, a junior course in the Architectural Engineering program. To eliminate this problem and to follow the pattern of other course titles for advanced courses in other department, the word "Advanced" will be used here in this course title. The ARE 640 course number was revised in the Fall of 2006 to ARE 540.

Impact: No direct impact except to eliminate confusion on which course is which.

From: ARE 590. Integrated Building System Design. (3) I, II. Methods for integration and coordination of structural, mechanical, electrical, and lighting systems in the building architectural design process. Two hours rec., four hours lab per week. Pr.: ARE 411, 532, 524, 528, 533, 536, and 540. ~~Must be taken the semester immediately prior to ARE 690 Senior Project.~~

To: ARE 590. Integrated Building System Design. (3) I, II. Methods for integration and coordination of structural, mechanical, electrical, and lighting systems in the building architectural design process. Two hours rec., four hours lab per week. Pr.: ARE 411, 532, 524, 528, 533, 536, and 540.

Rationale: Since many of our students at that course level are majors in the combined Bachelor/Masters Program, some have a semester between this course and the Senior Project course. Therefore this statement is not accurate.

Impact: No direct impact.

From: ARE 690. Senior Project. (3) I, II. Student working individually with laboratory support will prepare and present a project of appropriate scope and complexity with emphasis on structural, mechanical, ~~acoustical~~, electrical ~~and lighting requirements~~. Nine hours lab a week. Pr.: ARE 590, and CE 522. Must be taken concurrently with ARE 539 ~~Architectural Engineering Management~~.

To: ARE 690. Senior Project. (3) I, II. Student working individually with laboratory support will prepare and present a design project of appropriate scope and complexity with emphasis on structural or mechanical and electrical building systems. Nine hours lab a week. Pr.: ARE 590, and CE 522. Must be taken concurrently with ARE 539 .

Rationale: The description revision is to bring the wording to match the ABET accreditation terminology.

Impact: No direct impact.

From: ARE 710. Building Energy Analysis. (2) I. Study of building energy consumption and current modeling techniques to analyze overall energy usage including: economic evaluation and energy efficient system selection for new construction. Two hours rec. a week. Pr.: ARE ~~640~~ or instructor permission.

To: ARE 710. Building Energy Analysis. (2) I. Study of building energy consumption and current modeling techniques to analyze overall energy usage including: economic evaluation and energy efficient system selection for new construction. Two hours rec. a week. Pr.: ARE 533, 540 or instructor permission.

Rationale: The ARE 640 course number was revised in the Fall of 2006 to ARE 540. This is merely a text correction. Since the material in ARE 710 builds upon ARE 533 Building Electrical Systems, it must become a prerequisite for this course.

Impact: No direct impact.

From: ARE 735. Electrical Systems Design. (3) I. ~~Complete design and specifications of electrical systems for a selected structure.~~ The course uses the National Electrical Code in conjunction with all the modern techniques of electrical systems design for buildings. ~~Students are required to develop term research design projects.~~ Two hours rec. and three hours lab a week. Pr.: ARE 533.

To: ARE 735. Electrical Systems Design. (3) I. Design and application of various electrical distribution system components. The course uses the National Electrical Code in conjunction with all the modern techniques of electrical systems design for buildings. Two hours rec. and three hours lab a week. Pr.: ARE 533.

Rationale: The description revision is to accurately state the course objectives which look at a variety of system components in multiple buildings.

Impact: None.

Biological and Agricultural Engineering

Course and Curriculum Changes
Fall 2007

Degree Program Name Change

FROM: Bachelor of Science in Biological ~~and Agricultural~~ Engineering

TO: Bachelor of Science in Biological Systems Engineering

RATIONALE: The current degree program in the Department of Biological and Agricultural Engineering is named “Biological and Agricultural Engineering” and is accredited through the Accreditation Board for Engineering and Technology (ABET) under the program criteria for “Agricultural and similarly named engineering programs”. However in 2006/07 ABET adopted a new program criteria for “Biological and similarly named engineering programs”. Under the general ABET accreditation criteria for baccalaureate level programs, Criterion 8 “Program Criteria” states “If a program, by virtue of its title, becomes subject to two or more sets of Program Criteria, then that program must satisfy each set of Program Criteria; however, overlapping requirements need to be satisfied only once.” Therefore, since our current degree program name has both Biological and Agricultural Engineering names, we would need to satisfy both program criteria. This would require two ABET reports and two ABET program evaluators. This requires extra work and expense that is difficult to justify. Thus, the faculty decided to adopt a name with a single program modifier and to follow the Biological Engineering criteria.

Survey results from peer departments across the U.S. showed that several use one of the two following modifiers “Biological Systems Engineering” (UC Davis, Nebraska, VA Tech, and Wisconsin; Texas A&M is planning to use this) and “Biosystems Engineering” (Arizona, Auburn, Clemson, Michigan State, Oklahoma State, Tennessee.). The faculty and students were surveyed in the spring to choose one of these modifiers. The majority of both groups chose “Biological Systems Engineering” as the preferred program name. Note: Because the Department name is well recognized within the university and across the region, and does not need to be directly tied to the degree program name, it is to remain unchanged as Biological and Agricultural Engineering.

IMPACT: None to other departments. Discussion has occurred with other departments within the Colleges of Engineering and Agriculture and the Division of Biology and there are no concerns.

EFFECTIVE DATE: Fall 2008

Course Changes

- FROM:** ~~BAE 500~~. Properties of Biological Materials. (2) II. Characterization of biological material properties that affect the design and analysis of material handling equipment and processes. Physical, electrical, thermal, mechanical, aerodynamic, hygroscopic, and rheological properties of grain and other agricultural products will be examined. One hour rec. and three hours lab a week. Pr. PHYS 213.
- TO:** BAE 345. Properties of Biological Materials. (2) II. Characterization of biological material properties that affect the design and analysis of material handling equipment and processes. Physical, electrical, thermal, mechanical, aerodynamic, hygroscopic, and rheological properties of grain and other agricultural products will be examined. One hour rec. and three hours lab a week. Pr. PHYS 213.
- RATIONALE:** The course is more appropriate as a medium level undergraduate course, than as a top level undergraduate course.
- IMPACT:** No impact to other departments.
- EFFECTIVE DATE:** Spring 2008
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FROM: ~~BAE 530. Natural Resource Engineering. (3) II. Principles and measures for controlling storm water runoff and soil erosion including hydrology and surface water flow; design of water handling structures for land drainage, flood protection, and irrigation; pipeline flow and pump selection. Two hours rec. and three hours lab a week. Pr. STAT 490. Pr. or conc. ME 571. Not available for students with credit for CE 550.~~

TO: BAE 560. Natural Resource Engineering I. (3) II. Principles and measures for controlling storm water runoff and soil erosion including hydrology and surface water flow; design of water handling structures for land drainage, flood protection, and irrigation. Three hours rec a week. Pr. STAT 490. Pr. or conc. ME 571. Not available for students with credit for CE 550.

RATIONALE: In order to provide a more complete understanding of natural resource engineering, we are developing a 2 class series (BAE 560 and BAE 660 to be renumbered from BAE 530 and BAE 705) required for all environmental option students. BAE 560 will focus on gravitational flow systems; BAE 660 will focus on pressurized systems. By removing information on pumps and pipelines from BAE 560, information previously taught in BAE 531 can be covered in BAE 560.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Fall 2008

FROM: ~~BAE 535. Fundamentals of Structures and Environment Engineering. (3) I. Principles of environmental control for agricultural buildings and structures; analysis and design of structural systems and members for agricultural structures. Two hours rec. and three hours lab a week. Pr.: ME 513 and CE 333.~~

TO: BAE 535. Structures and Environment Engineering. (3) I. Environmental control for agricultural buildings and structures; analysis and design of structural systems and members for agricultural structures. Three hours rec. a week. Pr. or conc: ME 513 and CE 333 or CE 530.

RATIONALE: This change will allow BAE 535 to be taken concurrently with ME 513 and CE 333 or CE 530, to be more consistent with necessary course entry knowledge and allow BAE 535 to be taken earlier in the student's program of study. The lab, which has traditionally involved laboratory demonstrations, problem workshops, and tours, will be incorporated in the recitation periods.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Fall 2008

FROM: BAE 536. ~~Agricultural~~ Engineering Design I. (2) I. Team-oriented design laboratory, with projects selected to address design of equipment or systems to produce or process food, fiber, and energy, or to preserve environmental quality, remediate damage, and conserve natural resources. ~~Two~~ 3-hour labs a week. Pr.: ME 533 or BAE 530 or BAE 575.

TO: BAE 536. Biological Systems Engineering Senior Design. (3) I. Team-oriented design laboratory, with projects selected to address design of equipment or systems to produce or process food, fiber, and energy, or to preserve environmental quality, remediate damage, and conserve natural resources. Three 3-hour labs a week. Pr.: BAE 331 and one of the following courses: ME 533, BAE 545, BAE 560.

RATIONALE: Course name reflects current degree program name. Credit increased from 2 to 3 hours to allow greater depth in design experience.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

FROM: ~~BAE 575. Fundamentals of Agricultural Process Engineering. (3) I, Application of basic science and engineering fundamentals for the analysis and design of agricultural processes. Two~~ hours rec. ~~and three hours lab~~ a week. Pr. or conc.: CHE 320 or ME 571.

TO: BAE 545. Biological Process Engineering. (3) I. Analysis and design of biological and agricultural processes. Three hours rec. a week. Pr. or conc.: CHE 320 or ME 571.

RATIONALE: Course name and descriptions will reflect current course content. Course is being renumbered for consistency within the department.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Fall 2008

FROM: BAE 636. ~~Agricultural Engineering Design II. (2) II. A continuation of BAE 536.~~ Completion of a team-oriented design project, with emphasis on construction, evaluation, documentation, and presentation of the design. ~~Two 3-hour labs a week.~~ Pr.: BAE 536.

TO: BAE 636. Biological Systems Engineering Design Project. (3) I, II. Completion of a team-oriented design project, with emphasis on construction, evaluation, documentation, and presentation of the design. By appointment. Pr.: BAE 536 or other approved capstone design course.

RATIONALE: Course changes will provide greater opportunity for students to participate in design experiences and team-based competitions.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

FROM: ~~BAE 705. Irrigation Engineering. (3) II, on sufficient demand.~~ Design and operative problems on the fundamentals of irrigation system design and management. ~~Soil, plant, and water relationships; pipeline and system hydraulic design; design of irrigation systems; filtration systems and chemigation; sources of water and water quality.~~ ~~Two~~ hours rec. ~~and three hours lab~~ a week. Pr. BAE 530, ~~and~~ AGRON 305 ~~or~~ CE 522. Pr. or conc. ME 571.

TO: BAE 660. Natural Resource Engineering II. (3) I. Design and operative problems on the fundamentals of irrigation/water application system design and management. Field water balances; sources of water and water quality; pipeline, pump, and system hydraulic design; design of irrigation/water application systems; filtration systems and water treatment. Three hours rec. a week. Pr. BAE 560 or CE 550. Pr. or conc. ME 571.

RATIONALE: In order to provide a more complete understanding of natural resource engineering, we are developing a 2 class series (BAE 560 and BAE 660 to be renumbered from BAE 530 and BAE 705) required for all environmental option students. BAE 560 will focus on gravitational flow systems; BAE 660 will focus on pressurized systems. By removing information on pumps and pipelines from BAE 560, information previously taught in BAE 531 can be covered in BAE 560.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Fall 2008

New Courses

ADD: BAE 231. Biological Systems Engineering Project I. (1) II. Completion of a team-oriented design project, with emphasis on applying computer tools to problem solving in biological systems engineering. Three hours lab. a week. Pr.: BAE 131.

RATIONALE: The Biological and Agricultural Engineering Department is reorganizing its courses to place more emphasis on design throughout the curriculum. Two one-hour labs (BAE 231 and BAE 331, BSE Project I and II) are being added: one as a second semester course, and one as a third semester course. These courses will provide two additional team-project experiences in the BAE curriculum for all options (Biological, Environmental, and Machinery) and will do so earlier in the program. This is anticipated to aid in student retention, increase understanding of disciplinary topics, and allow the senior design class (BAE 536, now BSE Senior Design) to focus on more advanced design topics.

IMPACT: No impact outside department.

EFFECTIVE DATE: Spring 2008

ADD: BAE 331. Biological Systems Engineering Project II. (1) I. Completion of a team-oriented design project, with emphasis on systems design, data collection, and quantitative analysis related to biological systems engineering. Three hours lab. a week. Pr.: BAE 231.

RATIONALE: The Biological and Agricultural Engineering Department is reorganizing its courses to place more emphasis on design throughout the curriculum. Two one-hour labs (BAE 231 and BAE 331, BSE Project I and II) are being added: one as a second semester course, and one as a third semester course. These courses will provide two additional team-project experiences in the BAE curriculum for all options (Biological, Environmental, and Machinery) and will do so earlier in the program. This is anticipated to aid in student retention, increase understanding of disciplinary topics, and allow the senior design class (BAE 536, now BSE Senior Design) to focus on more advanced design topics.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

ADD: BAE 665. Ecological Engineering Design. (3) I. Definition, classification, and practice of ecological engineering. Course describes ecological systems, ecosystem restoration, and the utilization of natural processes to provide societal services and benefits to nature. Three hours rec a week. Pr.: MATH 221 and one of the following courses: BAE 560, CE 563, BIOL 529, BIOL 612, ATM 661.

RATIONALE: BAE 690 and 761 currently address the study and modeling of nonpoint source pollution issues, treatment systems, and environmental remediation processes. Two new courses, BAE 665 and 669, will reorganize those materials and update some topics based on current advances in knowledge and technology.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

ADD: BAE 669. Watershed Modeling. (3) II. Even years. Study and evaluation of process equations used in watershed-scale, water-quality models. Use and application of watershed models. Three hours rec. a week. Pr.: GEOG 508 and one of the following courses: BAE 560, CE 550, ATM 661.

RATIONALE: BAE 690 and 761 currently address the study and modeling of nonpoint source pollution issues, treatment systems, and environmental remediation processes. Two new courses, BAE 665 and 669, will reorganize those materials and update some topics based on current advances in knowledge and technology.

IMPACT: No impact outside department.

EFFECTIVE DATE: Spring 2008

ADD: BAE 865. Advanced Ecological Engineering Design. (3) I. Advanced study of ecological engineering, systems and processes. Recommended background: Hydrology and Ecology. Three hours rec. a week. Not available for students with credit for BAE 665.

RATIONALE: This new course will support the graduate environmental engineering program in BAE.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

ADD: BAE 869. Advanced Watershed Modeling. (3) II. Even years. Advanced study and evaluation of process equations used in watershed-scale, water-quality models. Advanced application of watershed models. Recommended background: Hydrology and GIS. Three hours rec. a week. Not available for students with credit for BAE 669.

RATIONALE: This new course will support the graduate environmental engineering program in BAE.

IMPACT: No impact outside department.

EFFECTIVE DATE: Spring 2008

Drop Courses

DROP: BAE 531. Natural Resources Engineering Field Laboratory. (1) II. Natural Resource Engineering Field Laboratory. In-depth, field application of natural resource engineering analysis and design for controlling stormwater runoff and soil erosion; design of water handling structures for land drainage, flood protection, and irrigation; economic analysis of design options. Three hours lab a week. Pr.: AGRON 305 or CE 522. PR. or conc.: ME 571. Conc. BAE 530.

RATIONALE: BAE 531 is being dropped in a broader reorganization of natural resource engineering courses. In order to provide a more complete understanding of natural resource engineering, we are developing a 2 class series (BAE 560 and BAE 660) required for all environmental option students. BAE 560 will focus on gravitational flow systems; BAE 660 will focus on pressurized systems. By removing information on pumps and pipelines from BAE 560, information previously taught in BAE 531 can be covered in BAE 560.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Fall 2008

DROP: BAE 533. Applied Hydrology. (3) II. Study of water sources and movement above, on, and beneath the earth's surface. Topics include water law relating to water quality and water supply. Three hours rec. Prereq.: ATM 160 or PHYS 113 or PHYS 115.

RATIONALE: The course was intended as a medium level undergraduate course for non-engineering majors. Undergraduates in BAE and CE study hydrology in portions of other departmental courses. Enrollment was low. There is more interest in a higher level course useful for modelers. We are considering offering a new course in ecohydrology at a later time. BAE 533 was last taught about 4 years ago.

IMPACT: No impact to other departments.

EFFECTIVE DATE: Spring 2008

DROP: BAE 690. Non-Point Pollution Engineering. (3) I. Management of diffuse sources of pollution generally resulting from storm water and runoff. Use of models and Geographic Information Systems (GIS) to evaluate the extent and magnitude of non-point pollution, legislation and programs affecting non-point pollution, and design of treatment and management systems. Non-point pollutants addressed include: nutrients, pesticides, sediment, and hazardous wastes. Three hours lec. a week. Pr.: BAE551 or CE551.

RATIONALE: BAE 690 and 761 currently address the study and modeling of nonpoint source pollution issues, treatment systems, and environmental remediation processes. Two new courses, BAE 665 and 669, will reorganize those materials and update some topics based on current advances in knowledge and technology.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

DROP: BAE 761. Natural Treatment Systems. (3) I, even years. Engineering analysis, modeling, and design of natural systems for treating liquid and solid wastes. Applications of plant and microbial systems. Three hours rec. a week. Pr.: MATH 221 and one of the following courses: BAE 530, CE 563, BIOL 529 or 612, ATM 661.

RATIONALE: BAE 690 and 761 currently address the study and modeling of nonpoint source pollution issues, treatment systems, and environmental remediation processes. Two new courses, BAE 665 and 669, will reorganize those materials and update some topics based on current advances in knowledge and technology.

IMPACT: No impact outside department.

EFFECTIVE DATE: Fall 2008

Curriculum Changes

DROP General Curriculum Option.

RATIONALE: Students do not choose to enroll in the General option. The biological, environmental and machinery options better align with the coursework taught in Biological and Agricultural Engineering.

IMPACT: None to other departments.

EFFECTIVE DATE: Spring 2008

**CURRENT
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological and Agricultural Engineering
130 hours required for graduation**

MACHINERY OPTION

FROM:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 200	Intro. to Biol and Agric Engg Tech	2
CHM 210	Chemistry I	4
DEN 015	New Student Orientation	0
ECON 110	Principles of Macroeconomics	3
MATH 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking 1A	2
		<u>15</u>

Sophomore		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 350	Agricultural Machinery Systems.....	2
BAE 351	Agricultural Machinery Systems Lab.....	1
MATH 222	Analytic Geometry and Calculus III.....	4
ME 212	Engineering Graphics.....	2
	Humanities or Social Science Electives ^a	3
PHYS 213	Engineering Physics I.....	5
		<u>17</u>

Junior		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
CE 533	Mechanics of Materials.....	3
CHM 350	General Organic Chemistry.....	3
ME 512	Dynamics.....	3
STAT 490	Statistics for Engineers.....	1
	Humanities or Social Science Electives ^a	3
	Biology Elective	3
		<u>16</u>

Senior		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 535	Fund of Structures and Environ Engg.....	3
BAE 661	Air Pollution Engineering	
or		
BAE 530	Natural Resource Engineering (Spring semester course, if taken, use 3 hr Tech Elective in the fall) or	
BAE 575	Fundamentals of Agric-Process Engineering.	3
BAE 536	Agricultural-Engineering Design-I.....	2
ENGL 415	Written Communication for Engineers ^c	3
	Technical Electives.....	3
IMSE 530	Engineering Economic Analysis.....	2
		<u>16</u>

FROM:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BIOL 198	Principles of Biology.....	4
CHM 230	Chemistry II	4
ENGL 100	Expository Writing I	3
MATH 221	Analytic Geometry and Calculus II	4
		<u>15</u>

Sophomore		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 500	Properties of Biological Materials	2
CE 333	Statics	3
CIS 209	C/C++ Programming for Engineers	3
DEN 275	Intro to Personal & Professional Develop	1
MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II.....	5
		<u>18</u>

Junior		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
CE 522	Soil Mechanics I ^d	3
EECE 519	Electric Circuits and Control.....	4
ME 513	Thermodynamics I	3
ME 533	Machine Design I.....	3
ME 571	Fluid Mechanics	3
		<u>16</u>

Senior		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 636	Agricultural-Engineering Design-II.....	2
	(or approved capstone course)	
BAE 640	Instrumentation and Control for Bio Sys	3
BAE 650	Energy and Biofuel Engineering.....	3
	Machinery Technical Elective	6
	Humanities or Social Science Electives ^a	3
		<u>17</u>

^aHumanities and Social Science Electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^bTechnical, Science, and Biology Electives are to be chosen with the advice and approval of the faculty advisor and department head.

^c Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 130 hours required for graduation.

^dStudents may take either CE 522 (3) or AGRON 305 (4)

**PROPOSED
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological Systems Engineering
128 hours required for graduation**

MACHINE SYSTEMS OPTION

TO:			TO:		
Freshman			Freshman		
Fall Semester	COURSE	Sem. hrs.	Spring Semester	COURSE	Sem. hrs.
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 101	Intro Biol and Agric Engg Tech	1	BAE 231	Biological Systems Engg Project I	1
BAE 131	Intro Design Biological and Agric. Engg.	1	BIOL 198	Principles of Biology.....	4
CHM 210	Chemistry I	4	CHM 230	Chemistry II	4
ECON 110	Principles of Macroeconomics	3	ENGL 100	Expository Writing I	3
MATH 220	Analytic Geometry and Calculus I	4	MATH 221	Analytic Geometry and Calculus II	4
SPCH 105	Public Speaking 1A	2			16
		15			
Sophomore			Sophomore		
Fall Semester			Spring Semester		
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 331	Biological Systems Engg Project II	1	BAE 345	Properties of Biological Materials	2
BAE 350	Agricultural Machinery Systems.....	2	CE 333	Statics	3
BAE 351	Agricultural Machinery Systems Lab.....	1	DEN 325	Intro to Personal & Professional Develop	1
MATH 222	Analytic Geometry and Calculus III.....	4	MATH 240	Elementary Differential Equations	4
PHYS 213	Engineering Physics I.....	5	ME 212	Engineering Graphics.....	2
	Humanities or Social Science Elective ^a	3	PHYS 214	Engineering Physics II.....	5
		16			17
Junior			Junior		
Fall Semester			Spring Semester		
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 535	Structures and Environ Engineering	3	BAE 560	<u>Natural Resource Engineering I</u>	
CE 533	Mechanics of Materials.....	3			3
CHM 350	General Organic Chemistry.....	3	CE 522	Soil Mechanics I ^d	3
ME 512	Dynamics.....	3	EECE 519	Electric Circuits and Control.....	4
ME 513	Thermodynamics I	3	ME 571	Fluid Mechanics	3
STAT 490	Statistics for Engineers.....	1	ME 533	Machine Design I.....	3
		16			16
Senior			Senior		
Fall Semester			Spring Semester		
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 536	<u>Biological Systems Engg Senior Design</u>	3	BAE 636	<u>Biological Systems Engg Design Project</u>	3
BAE 545	<u>Biological</u> Process Engineering	3	BAE 640	Instrumentation and Control for Biol Sys	3
ENGL 415	Written Communication for Engineers ^c	3	BAE 650	Energy and Biofuel Engineering.....	3
IMSE 530	Engineering Economic Analysis.....	2	BAE 651	Air Pollution Engineering.....	3
	Humanities or Social Science Elective ^a	3		Humanities or Social Science Elective ^a	3
	<u>Machine Systems</u> Technical Elective ^b	3			15
		17			

^a Humanities and Social Science electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^b Machine Systems Technical Electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head.

^c Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 128 hours required for graduation.

^d Students may take either CE 522 (3) or AGRON 305 (4)

Biological and Agricultural Engineering Course and Curriculum Changes

Machine Systems Option

Courses to be Dropped	Courses to be Added
BAE 200 (2) Introduction to Biological and Agricultural Engineering Technology	BAE 101 (1) Introduction to Biological and Agricultural Engineering Technology
	BAE 131 (1) Introductory Design for Biological and Agricultural Engineers
	BAE 231 (1) Biological Systems Engineering Project I
	BAE 331 (1) Biological Systems Engineering Project II
Biology Elective (3)	BAE 536 (1) Biological Systems Engg Senior Design <i>Add 1 additional hour of credit</i>
CIS 209 (3) C Programming for Engineers	BAE 560 (3) Natural Resource Engineering I
Technical Elective (3)	BAE 651 (3) Air Pollution Engineering
DEN 275 (1) Intro to Personal and Professional Development	DEN 325 (1) Intro to Personal and Professional Development
DEN 015 (0) New Student Orientation Seminar	
Machinery Technical Elective (3)	BAE 636 (1) <i>Add 1 additional hour of credit</i>
Total hours dropped (15)	Total hours added (13)

RATIONALE:

BAE 200 was changed to BAE 101 and BAE 131. Curriculum needs to reflect this change. We are also adding aspects of design into earlier portions of the curriculum. This should help with student retention and in performance in upper level courses. DEN 275 was renumbered to DEN 325 and this change is being reflected in the curriculum.

EFFECTIVE DATE: Fall 2008

CURRENT
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological and Agricultural Engineering
130 hours required for graduation

ENVIRONMENTAL OPTION

FROM:		Sem.
Freshman		
Fall Semester	COURSE	hrs.
DEN 015	New Student Orientation	0
BAE 020	Engineering Assembly	0
BAE 200	Intro. to Biol. and Agric. Engg. Tech.	2
CHM 210	Chemistry I	4
ECON 110	Principles of Macroeconomics	3
MATH 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking 1A	2
		<u>15</u>

Sophomore		Sem.
Fall Semester		
COURSE		hrs.
BAE 020	Engineering Assembly	0
BAE 350	Agricultural Machinery Systems	2
MATH 222	Analytic Geometry and Calculus III	4
ME 212	Engineering Graphics	2
PHYS 213	Engineering Physics I	5
	Humanities or Social Science Electives ^a	3
		<u>16</u>

Junior		Sem.
Fall Semester		
COURSE		hrs.
AGRON 305	Soils	4
BAE 020	Engineering Assembly	0
CE 533	Mechanics of Materials	3
CHM 350	General Organic Chemistry	3
ME 512	Dynamics	3
STAT 490	Statistics for Engineers	1
	Humanities or Social Science Electives ^a	3
		<u>17</u>

Senior		Sem.
Fall Semester		
COURSE		hrs.
BAE 020	Engineering Assembly	0
BAE 535	Fund of Structures and Environ Engg.	3
BAE 536	Agricultural Engineering Design I	2
BAE 651	Air Pollution Engineering	3
BAE 690	Non Point Pollution Engineering	3
ENGL 415	Written Communication for Engineers ^c	3
	Environmental Technical Elective	3
	Humanities or Social Science Electives ^a	3
		<u>17</u>

FROM:		Sem.
Freshman		
Spring Semester	COURSE	hrs.
BAE 020	Engineering Assembly	0
BIOL 198	Principles of Biology	4
CHM 230	Chemistry II	4
ENGL 100	Expository Writing I	3
MATH 221	Analytic Geometry and Calculus II	4
		<u>15</u>

Sophomore		Sem.
Spring Semester		
COURSE		hrs.
BAE 020	Engineering Assembly	0
BAE 500	Properties of Biological Materials	2
CE 333	Statics	3
CIS 209	C/C++ Programming for Engineers	3
DEN 275	Intro to Personal & Professional Develop	1
MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
		<u>18</u>

Junior		Sem.
Spring Semester		
COURSE		hrs.
BAE 020	Engineering Assembly	0
BAE 530	Natural Resource Engineering	3
BAE 531	Natural Resource Engineering Field Lab	1
EECE 519	Electric Circuits and Control	4
ME 513	Thermodynamics I	3
ME 571	Fluid Mechanics	3
	Biology Elective	3
		<u>17</u>

Senior		Sem.
Spring Semester		
COURSE		hrs.
BAE 020	Engineering Assembly	0
BAE 636	Agricultural Engineering Design II	2
	(or approved capstone course)	
BAE 640	Instrumentation and Control for Bio Sys	3
IMSE 530	Engineering Economic Analysis	2
	Environmental Technical Elective	3
	Science Electives	3
		<u>15</u>

^aHumanities and Social Science electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^bTechnical, Science and Biology electives are to be chosen with the advice and approval of the faculty advisor and department head.

^c Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 130 hours required for graduation.

Effective Fall 2004

8/20/2003

PROPOSED
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological Systems Engineering
128 hours required for graduation

ENVIRONMENTAL OPTION

TO:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 101	Intro Biol and Agric Engg Tech	1
BAE 131	Intro Design Biological and Agric Engineers.....	1
CHM 210	Chemistry I	4
ECON 110	Principles of Macroeconomics	3
ECON 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking 1A	2
		15

TO:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 331	Biological Systems Engg Project II	1
CHM 350	General Organic Chemistry.....	3
MATH 222	Analytic Geometry and Calculus III.....	4
PHYS 213	Engineering Physics I.....	5
STAT 490	Statistics for Engineers.....	1
	Humanities or Social Science Elective ^a	3
		17

TO:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 545	Biological Process Engineering	3
AGRON 305	Soils.....	4
GEOG 508	Geographic Information Systems I	3
ME 513	Thermodynamics I.....	3
ME 571	Fluid Mechanics.....	3
		16

TO:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 535	Structures and Environ Engineering	3
BAE 536	Biological Systems Engg Senior Design.....	3
BAE 660	Natural Resource Engineering II.....	3
	Ecoengineering Elective ^b	3
	Environmental Technical Elective ^b	1
	Humanities or Social Science Elective ^a	3
		16

TO:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 231	Biological Systems Engg Project I.....	1
BIOL 198	Principles of Biology.....	4
CHM 230	Chemistry II	4
ENGL 100	Expository Writing I	3
MATH 221	Analytic Geometry and Calculus II	4
		16

TO:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 345	Properties of Biological Materials	2
CE 530	Statics and Dynamics.....	3
DEN 325	Intro to Personal & Professional Develop	1
IMSE 530	Engineering Economic Analysis.....	2
MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II.....	5
		17

TO:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 560	Natural Resource Engineering I	3
BAE 651	Air Pollution Engineering	3
EECE 519	Electric Circuits and Control.....	4
ENGL 415	Written Communication for Engineers	3
	Biology Elective ^b	3
		16

TO:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 640	Instrumentation and Control for Biol Sys	3
	Environmental Technical Elective ^b	3
	Environmental Technical Elective ^b	3
	Humanities or Social Science Elective ^a	3
	Science Elective ^b	3
		15

^a Humanities and Social Science electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^b Environmental Technical, Ecoengineering, Science and Biology electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head.

^c Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 128 hours required for graduation.

Effective Spring 2008
9/5/07

Biological and Agricultural Engineering Curriculum Changes

Environmental Option

Courses to be Dropped	Courses to be Added
BAE 200 (2) Introduction to Biological and Agricultural Engineering Technology	BAE 101 (1) Introduction to Biological and Agricultural Engineering Technology
	BAE 131 (1) Introductory Design for Biological and Agricultural Engineers
BAE 636 (2) Agricultural Engineering Design II	BAE 231 (1) Biological Systems Engg Project I
	BAE 331 (1) Biological Systems Engg Project II
Engineering Tech Elec (1) <i>Dropping only 1 of the 2 hours required</i>	BAE 536 (1) Biological Systems Engg Senior Design <i>Adding only 1 additional hour to original course</i>
CIS 209 (3) C Programming for Engineers	BAE 545 (3) Biological Process Engineering
CE 533 (3) Mechanics of Materials	BAE 660 (3) Natural Resource Engineering II
CE 333 (3) Statics	CE 530 (3) Statics and Dynamics
ME 512 (3) Dynamics	Ecoengineering Elective (3)
DEN 275 (1) Intro to Personal and Professional Development	DEN 325 (1) Intro to Personal and Professional Development
ME 212 (2) Engineering Graphics	GEOG 508 (3) Geographic Information Systems
BAE 531 (1) Natural Resource Engineering Field Laboratory	
BAE 350 (2) Agricultural Machinery Systems	
DEN 015 (0) New Student Orientation Seminar	
BAE 690 (as an optional course) Non-Point Pollution Engineering	
Total hours dropped (23)	Total hours added (21)

RATIONALE:

BAE 200 was changed to BAE 101 and BAE 131. Curriculum needs to reflect this change. We are also adding aspects of design into earlier portions of the curriculum. This should help with student retention

and in performance in upper level courses. DEN 275 was renumbered to DEN 325 and this change is being reflected in the curriculum.

We are combining CE 333 (Statics) and ME 512 (Dynamics) to the combined course (CE 530, Statics and Dynamics). We are also dropping ME 212 (Graphics) and adding GEOG 508 (GIS) to provide a more current background in GIS technology for our environmental students.

IMPACT STATEMENT:

Dr. Shawn Hutchinson, Director of the GISSAL lab and primary instructor of Geographic Information Sciences approves this change.

EFFECTIVE DATE: Fall 2008

**CURRENT
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological and Agricultural Engineering
130 hours required for graduation**

BIOLOGICAL OPTION

FROM:		Sem.
Freshman		hrs.
Fall Semester	COURSE	
BAE 020	Engineering Assembly	0
BAE 200	Intro. to Biol. and Agric. Engg. Tech.....	2
CHM 210	Chemistry I	4
DEN 015	New Student Orientation Seminar.....	0
ECON 110	Principles of Macroeconomics	3
MATH 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking 1A	2
		15

Sophomore		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
CHM 350	General Organic Chemistry.....	3
CHM 351	General Organic Chemistry Lab.....	2
MATH 222	Analytic Geometry and Calculus III.....	4
PHYS 213	Engineering Physics I.....	5
	Humanities or Social Science Elective ^a	3
		17

Junior		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
CE 530	Statics and Dynamics	3
EECE 519	Electric Circuits and Control	4
ME 513	Thermodynamics I.....	3
	Biology / Biochemistry / Chemistry Elective ^b	3
	Humanities or Social Science Elective ^a	3
		16

Senior		Sem.
Fall Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 536	Agricultural Engineering Design I.....	2
BAE _____	BAE Elective.....	3
ENGL 415	Written Communication for Engineers ^d	3
	College of Engineering Elective ^c	6
	Biology / Biochemistry / Chemistry Elective ^b	3
		17

FROM:		Sem.
Freshman		hrs.
Spring Semester	COURSE	
BAE 020	Engineering Assembly	0
BIOL 198	Principles of Biology.....	4
CHM 230	Chemistry II	4
ENGL 100	Expository Writing I ^d	3
MATH 221	Analytic Geometry and Calculus II	4
ME 212	Engineering Graphics.....	2
		17

Sophomore		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 500	Properties of Biological Materials	2
BIOL 455	General Microbiology	4
DEN 275	Personal/Professional Development.....	1
MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II.....	5
		16

Junior		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
ME 571	Fluid Mechanics	3
STAT 510	Introduction to Statistics I	3
	College of Engineering Elective ^c	4
	Humanities or Social Science Elective ^a	3
	Biology / Biochemistry / Chemistry Elective^b.....	3
		17

Senior		Sem.
Spring Semester		hrs.
COURSE		
BAE 020	Engineering Assembly	0
BAE 636	Agricultural Engineering Design II.....	2
	(or approved capstone course)	
BAE 640	Instrumentation and Control for Bio Sys	3
BAE _____	BAE Elective	3
IMSE 530	Engineering Economic Analysis	2
	College of Engineering Elective ^c	3
	Biology / Biochemistry / Chemistry Elective ^b	3
		16

^aHumanities & social science electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^bBiology, Biochemistry, and Chemistry electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head. Six of the 12 hours must be 400 level or higher.

^cCollege of Engineering electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head.

^d Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 130 hours required for graduation.

**PROPOSED
BIOLOGICAL & AGRICULTURAL ENGINEERING
Kansas State University
Bachelor of Science in Biological Systems Engineering
128 hours required for graduation**

BIOLOGICAL OPTION

TO:		Sem.	TO:		Sem.
Freshman			Freshman		
Fall Semester	COURSE	hrs.	Spring Semester	COURSE	hrs.
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 101	Intro Biol and Agric Engg Tech	1	BAE 231	Biological Systems Engg Project I	1
BAE 131	Intro Design Biological and Agric Engineers ..	1	BIOL 198	Principles of Biology	4
CHM 210	Chemistry I	4	CHM 230	Chemistry II	4
ECON 110	Principles of Macroeconomics	3	ENGL 100	Expository Writing I ^d	3
MATH 220	Analytic Geometry and Calculus I	4	MATH 221	Analytic Geometry and Calculus II	4
SPCH 105	Public Speaking 1A	2			16
		15			
Sophomore			Sophomore		
Fall Semester	COURSE	hrs.	Spring Semester	COURSE	hrs.
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 331	Biological Systems Engg Project II	1	BAE 345	Properties of Biological Materials	2
CHM 350	General Organic Chemistry	3	CE 530	Statics and Dynamics	3
MATH 222	Analytic Geometry and Calculus III	4	CHM 351	General Organic Chemistry Lab	2
PHYS 213	Engineering Physics I	5	DEN 325	Intro to Personal & Professional Develop	1
	Humanities or Social Science Elective ^a	3	MATH 240	Elementary Differential Equations	4
		16	PHYS 214	Engineering Physics II	5
					17
Junior			Junior		
Fall Semester	COURSE	hrs.	Spring Semester	COURSE	hrs.
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 545	Biological Process Engineering	3	BAE _____	BAE Elective ^c	3
EECE 519	Electric Circuits and Control	4	BIOL 455	General Microbiology	4
ME 513	Thermodynamics I	3	STAT 510	Introduction to Statistics I	3
ME 571	Fluid Mechanics	3		College of Engineering Elective ^c	3
	Biology / Biochemistry / Chemistry Elective ^b	3		Humanities or Social Science Elective ^a	3
		16			16
Senior			Senior		
Fall Semester	COURSE	hrs.	Spring Semester	COURSE	hrs.
BAE 020	Engineering Assembly	0	BAE 020	Engineering Assembly	0
BAE 536	Biological Systems Engg Senior Design	3	BAE 640	Instrumentation and Control for Biol Sys	3
BAE _____	BAE Elective ^c	3		College of Engineering Elective ^c	3
ENGL 415	Written Communication for Engineers ^d	3		College of Engineering Elective ^c	3
IMSE 530	Engineering Economic Analysis	2		Biology / Biochemistry / Chemistry Elective ^b	3
	College of Engineering Elective ^c	3		Humanities or Social Science Elective ^a	3
	Biology / Biochemistry / Chemistry Elective ^b	3			15
		17			

^a Humanities & Social Science electives are to be selected from the approved list and need not be taken in order listed in the curriculum (2 courses must be 300 level or above).

^b Biology, Biochemistry, and Chemistry electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head. Six of the 9 hours must be 400 level or higher.

^c College of Engineering and BAE electives are to be chosen from an approved departmental list of courses with the advice and approval of the faculty advisor and department head.

^d Prerequisites for Written Communication for Engineers (ENGL 415) must be met from Expository Writing I or II. If both ENGL 100 and ENGL 200 must be taken, the additional 3 hours do not count towards the 128 hours required for graduation.

**Effective Spring 2008
9/5/07**

Biological and Agricultural Engineering Curriculum Changes

Biological Option

Courses to be Dropped	Courses to be Added
BAE 200 (2) Introduction to Biological and Agricultural Engineering Technology	BAE 101 (1) Introduction to Biological and Agricultural Engineering Technology
	BAE 131 (1) Introductory Design for Biological and Agricultural Engineers
BAE 636 (2) Agricultural Engineering Design II	BAE 231 (1) Biological Systems Engineering Project I
	BAE 331 (1) Biological Systems Engineering Project II
Biology/Biochemistry/Chemistry Elective (3)	BAE 545 (3) Biological Process Engineering
COE Elective (1) <i>Dropping only 1 hour of credit</i>	BAE 536 (1) Biological Systems Engg Senior Design <i>Add 1 hour of additional credit</i>
DEN 275 (1) Intro to Personal and Professional Development	DEN 325 (1) Intro to Personal and Professional Development
DEN 015 (0) New Student Orientation Seminar	
ME 212 (2) Engineering Graphics	
Total hours dropped (11)	Total hours added (9)

RATIONALE:

BAE 200 was changed to BAE 101 and BAE 131. Curriculum needs to reflect this change. We are also adding aspects of design into earlier portions of the curriculum. This should help with student retention and in performance in upper level courses. DEN 275 was renumbered to DEN 325 and this change is being reflected in the curriculum.

EFFECTIVE DATE: Fall 2008

Civil Engineering

New Course:

ADD: CE 704. Responsibility in Engineering: Leadership & Diversity. (3). I. Course designed to help engineers, scientists, and technical managers to: understand leadership approaches that promote high ethical conduct, and to understand the ethical value and challenges associated with a diverse workplace. Key activities are: interviewing peers; analyzing current environment for potential challenges; developing a workshop related to ethics, leadership and diversity; and writing individual code of ethics. Prerequisite: Graduate standing or instructor approval.

RATIONALE: There is a need to provide education on how to deal with technical ethical challenges related to leadership and diversity. Engineering leaders have a tremendous amount of pressure on them to reduce costs and shorten design time that is needed. Many decisions have ethical aspects and are made daily regarding costs, safety of design, design time requirements, etc. Consulting firms and agencies, and the public in general, desire engineers to have high ethical standards and be able to succeed in a diverse environment. This course covers leadership and diversity topics from an ethical perspective. The students that have completed the course have made very positive comments about this course and what they felt was learned. For example, "I have been able to discuss ethics with far greater intellect among my peers..., The class is very important for future engineers and scientists..., I think this class is very valuable to engineers etc." I believe this is the only graduate level engineering ethics/leadership/diversity course currently available for distance students in the United States.

IMPACT: None beyond the Civil Engineering Department.

EFFECTIVE: Fall 2008.

Course Change:

- FROM: CE 703. Responsibility in Engineering. (3). II. Course designed to help engineers, scientists, and technical managers to: understand fundamental "canons" of professional societies, establish or revitalize personal ethical standards using these canons, realize when situations are ethical dilemmas, and develop a process to solving dilemmas. Key activities are: interviewing peers, analyzing current environment for potential challenges, developing ethics workshop, and writing individual code of ethics. Prerequisite: Graduate standing or instructor approval.
- TO: CE 703. Responsibility in Engineering: Codes & Professionalism. (3). II. Course designed to help engineers, scientists, and technical managers to: understand fundamental "canons" of professional societies, establish or revitalize personal ethical standards using these canons, realize when situations are ethical dilemmas, and to develop a process to solving dilemmas. Key activities are: interviewing peers, analyzing current environment for potential challenges, developing ethics workshop, and writing individual code of ethics. Prerequisite: Graduate standing or senior with instructor approval.
- Rational: CE 704 will have a similar name so CE 703 needs a more descriptive title.
- Impact: None beyond the Civil Engineering Department.
- Effective: Spring 2008

CIS COURSE CHANGES

- DROP:** CIS 112. Advanced Personal Computing. (3) Advanced features of application software for personal computers, including batch files, configuration and maintenance of hardware and software, macros for application software, and sharing of data and programs. Individualized problems. Two hours lec. and four hours lab a week. Pr.: B or better in CIS 101 or permission of instructor.
- RATIONALE:** This course has not been taught for a number of years, and its content is outdated.
- EFFECTIVE:** Spring 2008.
- IMPACT:** No other department is affected by this change.
- DROP:** CIS 411. Global Information System. (3) Structure of large computer networks; information available via networks; databases, news groups, list servers, and hyper media. Handling of text, numeric, sound, and visual information. Application such as catalogs, distributed group work, and remote teaching. Issues of ethics, economics, and utility in use of networks; future technologies. Pr.: CIS 101 (understanding of use of personal computers and software).
- RATIONALE:** This course has not been taught for several years. It is listed as a UGE course, but never attracted many students, and we have no interest in offering it.
- EFFECTIVE:** Spring 2008.
- IMPACT:** No other department is affected by this change.
- DROP:** CIS 580. Numerical Computing. (3) I. Introduction to numerical algorithms fundamental to scientific computer work, including elementary discussion of error, roots of equations, interpolation, systems of equations, quadrature, and introduction to methods for solution of ordinary differential equations. Pr.: CIS 300 and MATH 221 and 551.
- RATIONALE:** This course has not been offered for many years, and we have no faculty who are interested in teaching it.
- EFFECTIVE:** Spring 2008.
- IMPACT:** No other department is affected by this change.

ADD: CIS 734. Introduction to Genomics and Bioinformatics. (4) II, in even years. A problem solving approach to understanding genomics and bioinformatics. Practical use of databases and web-based tools used to study biological problems. Introduction to the algorithms behind these tools. Three hours lec. and one-and-a-half hours lab a week. Cross-listed with BIOL 734. Pr.: Either BIOL 450 or CIS 300, and instructor permission.

RATIONALE: Ongoing transformation of biology from a data-poor science into an increasingly data-rich science has resulted in a large number of databases (e.g., protein sequences, structures, expression patterns, interactions) and tools for extracting information from such databases, leading to unprecedented opportunities for scientific knowledge discovery. Several departments at KSU, including CIS and Biology, aim at establishing a minor in the Bioinformatics area in order to prepare students for careers in this area. Our course represents one of the first steps towards establishing a common language between computer scientists and life scientists and thereby implementing the goals of the minor in Bioinformatics. It introduces students from CIS to problems in biology, and students from Biology to the algorithms behind tools that they often need to use. Adopting a practical problem solving approach, the course gives students the opportunity to become familiar with many biological databases and bioinformatics tools, in addition to understanding the algorithms behind these tools, thus setting up a solid base for more advanced Bioinformatics courses offered at KSU, such as Machine Learning for Bioinformatics (CIS 798, Fall 2007).

EFFECTIVE: Spring 2008.

IMPACT: This course is being proposed with the cooperation of the Division of Biology, which is proposing the cross-listed course, BIOL 734. The Department of Plant Pathology, which offers a related course (PLPTH 890, Introduction to Genomic Bioinformatics), also supports this proposal.

Electrical and Computer Engineering

Rationale:

for changes to the Electrical Engineering program structure:

The department wishes to move two course sequences to an earlier position in the curriculum to provide the necessary prerequisite material coverage prior to more advanced courses. These sequences are:

EECE 510 Circuit Theory 1, EECE 511 Circuit Theory 2
EECE 525 Electronics 1, EECE 526 Electronics 2

The sole reason that these changes have not been made in years past was that EECE 511 requires as prerequisite certain topics from MATH 240 Differential Equations and this course occupied the final position in a four-course chain including Calculus 1-3. An agreement has been reached (see attached) with the mathematics department to allow EECE students to take the Differential Equations course prior to Calculus 3. This allows the changes indicated above to be made.

Movement of these courses within the program structure has necessitated the repositioning of several other courses as indicated in the attached materials.

Finally, DEN015 New Student Orientation has been replaced by EECE 015.

Impact: An agreement has been reached (see attached) with the mathematics department to allow EECE students to take the Differential Equations course prior to Calculus 3. No impact beyond the EECE Dept.



Department of Electrical
and Computer Engineering
2061 Rathbone Hall
Manhattan, KS 66506-5204
785-532-5600

January 22, 2007

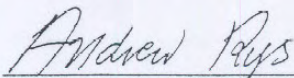
MEMORANDUM OF UNDERSTANDING

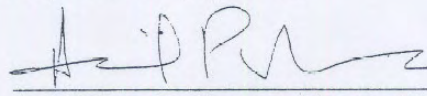
Louis Pigno, Professor and Head
Mathematics Department
138 Cardwell Hall
Manhattan, KS 66506-2602
Phone: 785-532-6750

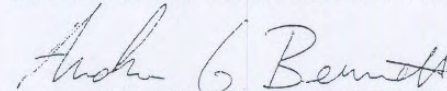
Per our discussion on January 22, 2007 please consider the following proposal:

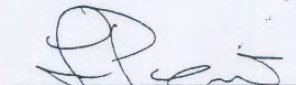
- 1) Change the prerequisite for Math 240 Elementary Differential Equations
From: Math 222
To: Math 222 or instructor permission
with the understanding that Electrical and Computer Engineering (EECE) students will be granted this permission on a continuous and ongoing basis.
- 2) It is understood that EECE students will continue to be required to complete both Math 222 and Math 240.
- 3) This change will allow EECE511 Circuit Theory 2, which requires Math 240 as a prerequisite, to be moved to an earlier position in the curriculum allowing, in turn, several desirable additional changes in the structure of the Electrical Engineering degree program.

Thank you for your consideration. Please contact me if you have any questions.


Andrew Rys, Professor and Chair
EECE Course & Curriculum Committee


Anil Pahwa, Professor and Interim Head
Electrical and Computer Engineering


Andrew Bennett, Professor and Chair
Mathematics Course & Curriculum Committee


Louis Pigno, Professor and Head
Mathematics Department

ELECTRICAL ENGINEERING
Curriculum for Bachelor of Science in Electrical Engineering
(129 hours total)
Effective Spring 2007

Accredited by the Engineering Accreditation Commission of ABET
111 Market Place, Suite 1050, Baltimore MD 21202-4012 - telephone (410) 347-7700

First Semester Course		Sem Hrs		Second Semester Course		Sem Hrs
FRESHMAN						
ENGL	100 Exposit Writing 1	3		ECON	110 Prin Macroecon	3
SPCH	105 Public Speaking 1A	2		PHYS	213 Engg Physics 1	5
CHM	210 Chemistry 1	4		MATH	221 Anal Geom Calc 2	4
MATH	220 Anal Geom Calc 1	4		CHM	230 Chemistry 2	4
EECE	210 Intro to Electrical Engg	3		BIOL	198 Prin of Biology	4
EECE	015 New Student Assembly	0		EECE	015 New Student Assembly	0
DEN	015 New Student Orient	0				
TOTAL		16		TOTAL		16
SOPHOMORE						
EECE	241 Intro to Computer Engg	3		CIS	209 C Prog for Engineers	3
MATH	222 Anal Geom Calc 3	4		MATH	240 Elem Diff Equations	4
PHYS	214 Engg Physics 2	5		DEN	325 Intro to Per & Prof Dev	1
CHE	350 Electronic Materials	2		STAT	510 Intro to Prob & Stat	3
UGE Hum or UGE Social Sci Elective		3		EECE	510 Circuit Theory 1	3
				UGE Hum or UGE Social Sci Elective		3
TOTAL		17		TOTAL		17
JUNIOR						
EECE	431 Microcontrollers	3		EECE	502 Electronics Lab	2
EECE	511 Circuit Theory 2	3		EECE	512 Linear Systems	3
EECE	525 Electronics 1	3		EECE	526 Electronics 2	3
CE	530 Statics & Dynamics	3		EECE	557 Electromagnetics	3
UGE Hum or UGE Social Sci Elective		3		EECE	581 Energy Conversion 1	3
				ENGL	415 Writ Comm Engr	3
TOTAL		15		TOTAL		17
SENIOR						
EECE	530 Control Sys Design	3		EECE	590 Seminar	1
ME	513 Thermo 1	3		Technical Electives		12
Technical Electives		9		UGE Hum or UGE Social Sci Elective		3
TOTAL		15		TOTAL		16

Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only three hours of ENGL 415 prerequisite credits toward degree requirements.

Humanities and Social Science (H & SS) electives must be from the official College of Engineering, University General Education (UGE) H & SS list. At least one course must be in Humanities. Students may transfer up to 6 hours of H & SS courses if not needed to meet UGE requirements.

Technical Electives must be selected to complete one of the areas of specialization.

9/06

PROPOSED/CHANGE ELECTRICAL ENGINEERING
Curriculum for Bachelor of Science in Electrical Engineering
(129 hours total)
Effective Spring 2008

Accredited by the Engineering Accreditation Commission of ABET
111 Market Place, Suite 1050, Baltimore MD 21202-4012 - telephone (410) 347-7700

First Semester Course		Sem Hrs		Second Semester Course		Sem Hrs
FRESHMAN						
ENGL	100 Exposit Writing 1	3		ECON	110 Prin Macroecon	3
SPCH	105 Public Speaking 1A	2		PHYS	213 Engg Physics 1	5
CHM	210 Chemistry 1	4		MATH	221 Anal Geom Calc 2	4
MATH	220 Anal Geom Calc 1	4		CHM	230 Chemistry 2	4
EECE	210 Intro to Electrical Engg	3		BIOL	198 Prin of Biology	4
EECE	015 New Student Assembly	0		EECE	015 New Student Assembly	0
TOTAL		16		TOTAL		16
SOPHOMORE						
EECE	241 Intro to Computer Engg	3		CIS	209 C Prog for Engineers	3
MATH	240 Elem Diff Equations	4		MATH	222 Anal Geom Calc 3	4
PHYS	214 Engg Physics 2	5		EECE	511 Circuit Theory 2	3
EECE	510 Circuit Theory 1	3		EECE	525 Electronics 1	3
DEN	325 Intro to Per & Prof Dev	1		UGE Hum or UGE Social Sci Elective		3
TOTAL		16		TOTAL		16
JUNIOR						
EECE	431 Microcontrollers	3		EECE	502 Electronics Lab	2
STAT	510 Intro to Prob & Stat	3		EECE	512 Linear Systems	3
EECE	526 Electronics 2	3		EECE	557 Electromagnetics	3
EECE	Technical Elective	3		EECE	581 Energy Conversion 1	3
UGE Hum or UGE Social Sci Elective		3		UGE Hum or UGE Social Sci Elective		3
TOTAL		15		ENGL	415 Writ Comm Engr	3
TOTAL		15		TOTAL		17
SENIOR						
EECE	530 Control Sys Design	3		EECE	590 Seminar	1
CE	530 Statics & Dynamics	3		ME	513 Thermo 1	3
CHE	350 Electronic Materials	2		UGE Hum or UGE Social Sci Elective		3
Technical Electives		9		Technical Electives		9
TOTAL		17		TOTAL		16

Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only three hours of ENGL 415 prerequisite credits toward degree requirements.

Humanities and Social Science (H & SS) electives must be from the official College of Engineering, University General Education (UGE) H & SS list. At least one course must be in Humanities. Students may transfer up to 6 hours of H & SS courses if not needed to meet UGE requirements.

Technical Electives must be selected to complete one of the areas of specialization.

9/06

Industrial and Manufacturing Systems Engineering

IMSE Course Changes – Industrial Engineering Program

FROM: IMSE 563. Manufacturing Processes Engineering. (4) II. The effects of operating variables on manufacturing processes such as machining, metal forming, casting, welding, plastics, etc. Emphases are on manufacturing process theory, process variables measurement, and the technical inferences of collected data. Strength of materials, manufacturing process theory, instrumentation, computer data acquisition, and data analysis concepts are included. Laboratory testing of manufacturing processes and the engineering design of experiments for process variable measurements are used to develop efficient manufacturing processes. Three hours rec. and three hours lab a week. Pr.: IMSE 250 and 251, CHE 352, CE 530 or statics equiv.

TO: IMSE 563. Manufacturing Processes Engineering. (3) II. The effects of operating variables on manufacturing processes such as machining, metal forming, casting, welding, plastics, etc. Emphases are on manufacturing process theory, process variables measurement, and the technical inferences of collected data. Strength of materials, manufacturing process theory, instrumentation, computer data acquisition, and data analysis concepts are included. Laboratory testing of manufacturing processes and the engineering design of experiments for process variable measurements are used to develop efficient manufacturing processes. Two hours rec. and Two hours lab a week. Pr.: IMSE 250 and 251, CHE 352, CE 530 or statics equiv.

RATIONALE: The credit hour is changed from 4 to 3 to properly reflect the amount of material covered.

Effective Date: Spring 2008

IMPACT: No other department will be affected by this change.