

Course Information

Date Submitted: 1/11/2013

Current Prefix and Number: BAE - Biosystems & Ag Engineering , BAE 403 - BIOSYS ENGIN DESIGN II

Other Course:

Proposed Prefix and Number:

What type of change is being proposed?

Major Change

Should this course be a UK Core Course? Yes

Inquiry - Arts & Creativity

1. General Information

a. Submitted by the College of: College of Engineering

b. Department/Division: Engineering

c. Is there a change in 'ownership' of the course? No

If YES, what college/department will offer the course instead: Select...

e. Contact Person

Name: Czarena Crofcheck

Email: crofcheck@uky.edu

Phone: 7-3000x212

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

f. Requested Effective Date

Semester Following Approval: Yes OR Effective Semester:

2. Designation and Description of Proposed Course

a. Current Distance Learning (DL) Status: N/A

b. Full Title: BIOSYSTEMS ENGINEERING DESIGN II

Proposed Title: BIOSYSTEMS ENGINEERING DESIGN II

c. Current Transcript Title: BIOSYS ENGIN DESIGN II

Proposed Transcript Title:

d. Current Cross-listing: none

Proposed – ADD Cross-listing :

Proposed – REMOVE Cross-listing:

e. Current Meeting Patterns

LECTURE: 1

LABORATORY: 2

Proposed Meeting Patterns

LECTURE: 1

LABORATORY: 2

f. Current Grading System: ABC Letter Grade Scale

Proposed Grading System: PropGradingSys

g. Current number of credit hours: 2

Proposed number of credit hours: 2

h. Currently, is this course repeatable for additional credit? No

Proposed to be repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester? No

2i. Current Course Description for Bulletin: Student design teams evaluate and enhance design solutions, fabricate prototypes, execute performance tests, analyze results, and develop final design specifications. Oral and written reports are required.

Proposed Course Description for Bulletin: Student design teams evaluate and enhance design solutions, fabricate prototypes, execute performance tests, analyze results, and develop final design specifications. Oral and written reports are required.

2j. Current Prerequisites, if any: Prereq: BAE 402.

Proposed Prerequisites, if any:

2k. Current Supplementary Teaching Component:

Proposed Supplementary Teaching Component:

3. Currently, is this course taught off campus? No

Proposed to be taught off campus? No

If YES, enter the off campus address:

4. Are significant changes in content/student learning outcomes of the course being proposed? No

If YES, explain and offer brief rationale:

5a. Are there other depts. and/or pgms that could be affected by the proposed change? **No**

If YES, identify the depts. and/or pgms:

5b. Will modifying this course result in a new requirement of ANY program? **No**

If YES, list the program(s) here:

6. Check box if changed to 400G or 500: **No**

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: **No**

Interactive Video: **No**

Hybrid: **No**

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? **NO**

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|BJSTOK0|Barbara J Brandenburg|College approval for ZCOURSE_CHANGE BAE 403|20121019

SIGNATURE|BJSTOK0|Barbara J Brandenburg|Subworkflow for GenEd Expert review|20121126

SIGNATURE|NCJONE0|Nancy C Jones|UKCEC Expert review ZCOURSE_CHANGE BAE 403|20121126

SIGNATURE|JMETT2|Joanie Ett-Mims|UKCore approval for ZCOURSE_CHANGE BAE 403|20121217

SIGNATURE|JMETT2|Joanie Ett-Mims|Undergrad Council approval for ZCOURSE_CHANGE BAE 403|20130110

General Education Course Submission Form

Date of Submission: July 12, 2012

1. Check which area(s) this course applies to.

Inquiry – Arts & Creativity	<input checked="" type="checkbox"/>	Composition & Communications - II	<input type="checkbox"/>
Inquiry – Humanities	<input type="checkbox"/>	Quant Reasoning – Math	<input type="checkbox"/>
Inquiry – Nat/Math/Phys Sci	<input type="checkbox"/>	Quant Reasoning – Stat	<input type="checkbox"/>
Inquiry – Social Sciences	<input type="checkbox"/>	Citizenship – USA	<input type="checkbox"/>
Composition & Communications - I	<input type="checkbox"/>	Citizenship - Global	<input type="checkbox"/>

2. Provide Course and Department Information.

Department: Biosystems & Agricultural Engineering

Course Prefix and Number: BAE 402 & BAE 403 Credit hours: 2 & 2

Course Title: BAE 402 & 403 Biosystems Engineering Design I & II

Expected Number of Students per Section: 30 Course Required for Majors in your Program? YES
For BAE 402: Prereq: BIO 150, 152; prereq or concur with BAE 417 or BAE 447

Prerequisite(s) for Course? and For BAE 403: Prereq: BAE 402

This request is for (check one): A New Course An Existing Course

Departmental Contact Information

Name: Czarena Crofcheck Email: Crofcheck@uky.edu

Office Address: 212 CEBA Phone: 257-3000x212

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including listing of the Course Template Student Learning Outcomes.
- A narrative (2-3 pages max) that explains: 1) how the course will address the General Education and Course Template Learning outcomes; and 2) a description of the type(s) of course assignment(s) that could be used for Gen Ed assessment.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair: _____ Date: _____

Dean: _____ Date: _____

College Deans: Submit all approved proposals electronically to:
Sharon Gill Sharon.Gill@uky.edu
Office of Undergraduate Education

INTELLECTUAL INQUIRY-ARTS AND CREATIVITY OUTCOMES

BAE 402/403 consists of a two semester sequence in conceptualization, analysis, design and prototyping of a device or system to meet a societal need related to biosystems engineering. Students are required to understand the conceptualization and design process, and to apply it in a team environment through the following process elements:

1. Critical inquiry to define customer needs (402);
2. Development of a project plan and product design specification that responds to the customer need (402);
3. Finding credible information from a variety of reference sources (402);
4. Through brainstorming and other techniques for creativity, development of a number of possible concepts to fulfill the product design specification (402);
5. Utilizing qualitative and quantitative methods of reasoning to evaluate the design concepts (402/403);
6. Selecting the “best” concept for implementation (402);
7. Completing the final design (403);
8. Developing a prototype (403);
9. Testing and evaluation of the prototype (403); and
10. Communicating the design solution via written and oral presentations. (402/403)

Lecture material to support the design process is provided, including

Product Specifications, Project planning and management; Team building; Engineering economic analysis; The creative elements and the design process, Concept development and selection for product design; Technical communication, written and verbal; Product life-cycle design, sustainable design; Safety and ergonomics; Environmental issues; Product liability; Patents and Intellectual property; Computational Tools; Reliability and Statistics in design; Design for manufacturing; and Engineering Design Ethics.

As such, the course sequence contributes to the following GenEd learning outcomes

- I. Students will demonstrate an understanding of and ability to employ the processes of intellectual inquiry. Process elements 1, 2, 3, 4, 8
- II. Students will demonstrate competent written, oral, and visual communication skills both as producers and consumers of information. Process element 9
- III. Students will demonstrate an understanding of and ability to employ methods of quantitative reasoning. Process elements 5, 6, 7

A description of the types of course assignments that could be used for Gen Ed assessment

The students are required to provide the following, and these are appropriate for Gen Ed assessment:

1. Prepare a written project plan including a product design specification.
2. Submit periodic written progress reports
3. Keep a notebook of individual work on the project effort, with an emphasis on their own contributions to original and creative design concepts.
4. Prepare a poster on their project activities
5. Provide an interim and final written report on their conceptualization and realization efforts
6. Provide a Presentation of their work using verbal and media communication.

Reviewer 1:

1. BAE 402/403-- "BIOSYSTEMS AND AGRICULTURAL ENGINEERING": The proposal for BAE 402 and 403 presents courses for a two-semester sequence that adhere closely to the learning outcomes for UK Core Arts & Creativity courses. Students will be required to creatively address questions, work together to find solutions, do research for their projects, and confront moral issues in their work. The course is product-focused; the artifact will be a product design for a device or system to meet a societal need related to biosystems engineering, which places emphasis on the creative and aesthetic aspects of the field. Over the course of the two semesters, the emphasis seems to be heavily on process, as students work together on these product designs and evaluate their work and other groups' work. The course does not yet specify attendance and/or participation requirements. Still, the proposal meets approval at this level.

BAE 403: Biosystems Engineering Design II
Biosystems and Agricultural Engineering
College of Engineering
Spring 2013

Instructor: Dr. Czarena Crofcheck
Rm 212 CE Barnhart Building - 257-3000 ext. 212 - crofcheck@uky.edu

Class Times: Lecture: M 3:00-3:50 and Lab: T 3:00-4:50 in Rm 236

Office Hours: By appointment or whenever my door is open.

BAE 403 Course Description:

Students design teams evaluate and enhance design solutions, fabricate prototypes, execute performance tests, and analyze results, and develop final design specifications. Oral and written reports are required. Prereq: BAE 402.

BAE 402/403 Student Learning Outcomes:

At the conclusion of the two semester series students should be able to:

1. Define and distinguish different approaches to creativity and creative inquiry.
2. Exercise creativity and engineering judgment in the design of complete systems.
3. Work individually and as a team member in developing project specifications and planning.
4. Develop the ability to integrate varied subject knowledge in engineering and apply it to conceptualization and design of systems.
5. Develop and evaluate design concepts in a team environment, with an emphasis on creativity in the design process.
8. Integrate environment, safety, quality, cost and contemporary issues/constraints in design.

BAE 403 Specific Student Learning Outcomes: 1- 8

Textbook:

Course Notes (provided)

Additional Reading:

- Petroski, Henry: *Success through Failure: The Paradox of Design*. [Princeton University Press, 2006]
- Fritz, Robert: *A Practical Guide to the Creative Process and How to use it to Create Anything*. [Ballantine, 1993]
- Engineering Design, Dieter and Schmidt, Engineering Design, 4th, McGraw Hill,
- Finkelstein, Pocket Book of Technical Writing for Engineers and Scientists, McGraw-Hill 2008, ISBN 978-0-07-319159-1

BAE 403 Grading:

Homework and Lecture Assignments	20%
Exam	10%
Third Quarterly Report:	20%

Oral (Individual) 5 %, Written (Team) 15 %	
Final Report:	30%
Oral (Individual) 10 %, Written (Team) 20 %	
Meeting Project Milestones/Engineering Notebook	10%
Professionalism (i.e., attendance)	5%
Marketing Materials	5%
Total	100%

Final grades will be assigned as follows: > 90 A, 80 - 89 B, 70 - 79 C, 60 - 69 D, < 59 E

Final Exam Information:

The final exam will be a team presentation (Rm 236) about the semester's accomplishments. See <http://www.uky.edu/registrar/final-hour-exam> for the time and date.

Mid-term Grade:

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/Registrar/AcademicCalendar.htm>)

Attendance Policy:

Your senior design experience will consist of in-class lectures, in-class design team meetings, outside of class design team meetings, individual work on the team project and on the individual projects. You will write reports individually and in teams and be evaluated the same way. You will present in teams, but you will be evaluated as individuals. There **will be an exam** over lecture material. For this reason, your presence and attention at every lecture is imperative.

Excused Absences:

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences:

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense

occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (available online www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1). Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Classroom conduct: Cell phones should be silent (no talking or texting) during class and recitation periods. I typically distribute handouts at the beginning of class. If you are late to class, it is your responsibility to come to the front of the class and pick up handouts, if you miss a day it is your responsibility to get a copy of the handout.

Assignments:

- Lecture assignments are to be turned in at the beginning of lecture.
- Project assignments (i.e. milestones) are to be emailed to Dr. Crofcheck on or before the due date. If you are going to miss the deadline, you must send an email to Dr. Crofcheck explaining why the assignment will be late and when you will be turning in the assignment. Be sure to cc: everyone on the team, including the faculty advisor.
- Reports are not necessarily due during class. You must turn in a hard copy of the report to Dr. Crofcheck or to the front office staff person.

Reports:

There will be four quarterly written reports for your project. You are responsible for being sure that everything required is included in the report. You are responsible for checking the score sheet for each report before turning in the report. You are responsible for making sure your report is the best it can possibly be.

BAE 403 Lecture/Lab Schedule:

Week	Mon (Lecture)	Tues (Work Day)
2 (1/14, 1/15)		Revision of Preliminary Designs and Drawings
3 (1/21, 1/23)	Hypothesis Testing & Experimental Design	Revision of Preliminary Designs and Drawings
4 (1/28,1/29)	Designing For Other Factors, Reliability	Statistical Plan
5 (2/4,2/5)	Design Economics, Cost Estimating	Prototype Fabrication
6 (2/11,2/12)	Ethics in Design	Prototype Fabrication
7 (2/18,2/19)	Ethics and Social & Political Factors	Prototype Fabrication
8 (2/25,2/26)	Disaster Engineering, Midterm Presentation Explanation	Prototype Testing
9 (3/4,3/5)	Multidisciplinary Issues	Prototype Testing
11 (3/18,3/19)	Health & Safety	Mid-term Presentations
12 (3/25, 3/26)	Environmental Factors	Data Analysis
13 (4/1,4/2)	Sustainability	Data Analysis
14 (4/8,4/9)	Senior Design Recap & Final Report Discussion Points	Preparing Final Reports
15 (4/15,4/16)	Exam over lecture material	Preparing Final Reports
16 (4/22,4/23)	Preparing Final Presentations	Preparing Final Presentations
16 (12/3,12/4)	Preparing Final Presentations	Preparing Final Presentations

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BAE 402/403 Assessment of ABET Outcomes*

2. Use techniques, skills and modern engineering tools necessary for engineering practice.
3. Design and conduct experiments, as well as to analyze and interpret data.
6. Solve BAE problems that are vague or poorly constrained.
8. Effectively communicate interpersonally, formally, and technically whether oral or written.
10. Work within a team approach to complete projects with many facets.
12. Understand professional and ethical responsibility.
13. Appreciate contemporary issues arising from industrially-relevant design questions.
16. Appreciate the advantages of being active in student clubs and professional organizations.

Corresponding assessment artifacts:

2. AutoCAD and excel assignments (402)
3. Statistics homework assignment and statistics section in the final report (403)
6. Executive summary and problem statement in the final report (403)
8. Teamwork report homework assignment (403)
12. Ethics homework assignments (403)
13. Contemporary issue homework assignment (403)
16. Membership in ASABE or IBE required and must be documented (403)

*Full list of ABET Outcomes can be found at

http://www.bae.uky.edu/academics/abet/objectives_outcomes.htm