

APPLICATION FOR NEW COURSE

1. Submitted by the College of Engineering Date: 10/23/2007
Department/Division proposing course: Biosystems & Agricultural Engineering
2. Proposed designation and Bulletin description of this course:
- a. Prefix and Number BAE 503
- b. Title: Fundamentals of Biorenewable Resource Engineering
If title is longer than 24 characters, write a sensible title (24 characters or less) for use on transcripts:
Fund Biorenew Res Eng
- c. Courses must be described by at least one of the categories below. Include the number of actual contact hours per week for each category, as applicable.
- () CLINICAL () COLLOQUIUM () DISCUSSION () LABORATORY () LECTURE
() INDEPEND. STUDY () PRACTICUM () RECITATION () RESEARCH () RESIDENCY
() SEMINAR () STUDIO () OTHER - Please explain: _____
- d. Please choose a grading system: Letter (A, B, C, etc.) Pass/Fail
- e. Number of credit hours: 3
- f. Is this course repeatable? YES NO If YES, maximum number of credit hours: _____
- g. Course description:
This course introduces students to the science and engineering of converting biorenewable resources into bioenergy and biobased products. Topics include: Defining the resource base; physical and chemical properties of biorenewable resources; description of biobased products; methods of production for biorenewable resources.
- h. Prerequisite(s), if any:
- i. Will this course be offered through Distance Learning? YES NO
If YES, please identify one of the methods below that reflects how the majority of the course content will be delivered:
- Internet/Web-based Interactive video Extended campus Kentucky Educational Television (KET/teleweb) Other
Please describe "Other": _____
3. Teaching method: N/A or Community-Based Experience Service Learning Component Both
4. To be cross-listed as: N/A
Prefix and Number Signature of chair of cross-listing department
5. Requested effective date (term/year): Spring / 09

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6. Course to be offered (please check all that apply): Fall Spring Summer
7. Will the course be offered every year? YES NO
If NO, please explain: _____
8. Why is this course needed?
The topic is timely given the emphasis on renewable energy, and biosystems engineering students need a general background in this area to be well-informed in today's job market.
9. a. By whom will the course be taught? Sue Nokes
- b. Are facilities for teaching the course now available? YES NO
If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?
15
11. a. Will this course serve students primarily within the department? Yes No
- b. Will it be of interest to a significant number of students outside the department? YES NO
If YES, please explain.
12. Will the course serve as a University Studies Program course?
If YES, under what Area? _____
 YES NO
¹AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.
13. Check the category most applicable to this course:
- traditional – offered in corresponding departments at universities elsewhere
 - relatively new – now being widely established
 - not yet to be found in many (or any) other universities
14. Is this course applicable to the requirements for at least one degree or certificate at UK? Yes No
15. Is this course part of a proposed new program? YES NO
If YES, please name: _____
16. Will adding this course change the degree requirements for ANY program on campus? YES NO
If YES², list below the programs that will require this course:

¹In order to change the program(s), a program change form(s) must also be submitted.

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17. The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18. Check box if course is 400G or 500. If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)
19. Within the department, who should be contacted for further information about the proposed new course?

Name: Sue Nokes Phone: 7-3000 x 215 Email: snokes@bae.uky.edu

20. Signatures to report approvals:

<p style="text-align: center;"><u>8-15-07</u> DATE of Approval by Department Faculty</p>	<p style="text-align: center;"><u>Scott A. Sheerer</u> / <u>[Signature]</u> <small>printed name</small> Reported by Department Chair <small>signature</small></p>
<p style="text-align: center;"><u>04/09/09</u> DATE of Approval by College Faculty</p>	<p style="text-align: center;"><u>Richard J Swergard</u> / <u>[Signature]</u> <small>printed name</small> Reported by College Dean <small>signature</small></p>
<p style="text-align: center;"><u>10/06/2009</u> * DATE of Approval by Undergraduate Council</p>	<p style="text-align: center;">/ <small>printed name</small> Reported by Undergraduate Council Chair <small>signature</small></p>
<p style="text-align: center;">_____ * DATE of Approval by Graduate Council</p>	<p style="text-align: center;">/ <small>printed name</small> Reported by Graduate Council Chair <small>signature</small></p>
<p style="text-align: center;">_____ * DATE of Approval by Health Care Colleges Council (HCCC)</p>	<p style="text-align: center;">/ <small>printed name</small> Reported by Health Care Colleges Council Chair <small>signature</small></p>
<p style="text-align: center;">_____ * DATE of Approval by Senate Council</p>	<p style="text-align: center;">/ Reported by Office of the Senate Council</p>
<p style="text-align: center;">_____ * DATE of Approval by University Senate</p>	<p style="text-align: center;">/ Reported by Office of the Senate Council</p>

*If applicable, as provided by the *University Senate Rules*

BAE 503- Fundamentals Biorenewable Resource Engineering

Instructor

Dr. Sue E. Nokes
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257-3000 ext 215
e-mail: snokes@bae.uky.edu
Office hours: MWF 1-2 pm

Textbook

Biorenewable Resources. Engineering new products from agriculture. Robert C. Brown. 2003. Iowa State Press. A Blackwell Publishing Company. ISBN 0-8138-2263-7

Course Content

This course introduces students to the science and engineering of converting biorenewable resources into bioenergy and biobased products. Topics include: defining the resource base; physical and chemical properties of biorenewable resources; description of biobased products; methods of production for biorenewable resources; processing technologies for fuels, chemicals, fibers and energy; environmental impacts; and economics of biobased products and bioenergy.

Homework

Homework assignments are due on the Thursday after they are assigned. Problems are expected to be worked on engineering paper. Please restate the problem, then work the problem in a neat, logical manner. Late homework will not be accepted, unless the student has a University excused absence. Homework will be considered late if it is turned in after 3 p.m. on the day it is due. If you turn any assignments in outside of class you may either hand it to me DIRECTLY or place it in my mailbox in room 128. Do not put assignments in my office or slide them under my door.

Midterms

A Midterm will occur in class on the assigned date. The test will be closed book and closed notes. No make-up exams will be given unless the student has a University excused absence.

Grading Scale

Grades will be assigned based on the percentage of points earned during the course of the semester. Grades associated with course percentages are as follows:

90-100%	A:
80-89.9%	B:
70-79.9%	C:
60-69.9%	D:
0-59.9%	E

Course Grades

The course elements will be factored into the final grade as follows:

Homework	20%
Modules (2)	30%
Midterm	20%
Final Exam	30%

Graduate students will also prepare and present lectures to the class. There will also be additional reading assignments for graduate students. The course elements will be factored into the final grade for graduate students as follows:

Homework	15%
Modules (2)	20%
Lectures (2)	20%
Midterm	20%
Final Exam	25%

Module and lecture requirements and deadlines will be discussed in class.

Learning Outcomes

At the completion of this course, the student should be able to:

- 1) List the major renewable feedstocks for biofuels and biochemicals, and describe the major cultural practices used to produce these crops.
- 2) Describe the pre-processing necessary to store materials.
- 3) Discuss the pre-treatment options for biomass, and the advantages and disadvantages of each.
- 4) Differentiate biochemical conversion from thermal conversion and list potential biofuels and biochemicals from each.
- 5) Describe Life Cycle Analysis and how it is used in the context of biorenewable resources.

Additional Learning Outcomes

In addition, at the completion of this course, the student should be able to intelligently discuss the following issues as they relate to biorenewable resources:

- 1) food vs. fuel
- 2) global warming/carbon credits
- 3) net energy gain/loss from fuel production
- 4) environmental impacts.

Excused Absences

Acceptable reasons for excused absences are listed in "Student Rights and Responsibilities". It is the responsibility of the student to notify the instructor as soon as the student knows that an excused absence will be necessary, and also to provide proof that the absence conforms to the University's policy.

Students are entitled to an excused absence for the purpose of observing major religious holidays, however the student must notify the instructor in writing prior to January 10, 2008 as to which days they will be absent.

BAE 503- Fundamentals Biorenewable Resource Engineering

Week	Date	Topic	Reading	Notes
1	10-Jan	Introductions; Overview	1.1-1.6 Roadmaps	
2	15-Jan 17-Jan	History of Chemurgy Fundamentals (Thermo)	History of Chemurgy 2.2	Last day to add classes Project 1 Assigned Brock Video
3	22-Jan 24-Jan	Fundamentals: Organic Chemistry; Plant chemistry	2.3; 2.4	
4	29-Jan 31-Jan	Environmental Impact; Global Climate Change	9.1-9.3; Climate Shift	Jan 30 - last day to drop classes
5	5-Feb 7-Feb	Environmental Impact; Life Cycle Analyses	9.4-9.5; Life Cycle Natural Fibers ME Power 2003	Project 1 Due
6	12-Feb 14-Feb	Production Economics	10.1-10.3.1	Project 2 Assigned
7	19-Feb 21-Feb	Processing Economics	10.3.2-10.4	
8	26-Feb 28-Feb	Biorenewable Resource Base	3.1-3.4	
9	4-Mar 6-Mar	Midterm Exam (Thursday)		Project 2 Due Midterm Week
10	11-Mar 13-Mar	Spring Break - No classes		Spring Break
11	18-Mar 20-Mar	Production: Herbaceous & Woody	NRDC Growing Energy p 24-37; 4.1-4.3	Herb. Prod. & Woody Harvest Videos; Project 3 Assigned
12	25-Mar 27-Mar	Production: Transgenics; Products: Heat & Power; Fuels	4.4-4.5; 5.1-5.3	
13	1-Apr 3-Apr	Products: Chemicals and Fibers; Polymers	5.3-5.5; Green Plastics p 31-51; 83-103	Project 3 Due
14	8-Apr 10-Apr	Processing: Heat & Power	6.1-6.4; 7.1-7.3	Project 4 Assigned Biomass Power Video
15	15-Apr 17-Apr	Processing: Fuels & Chemicals; Fibers: Case Studies	7.4-7.6; 8.1-8.4 David Morris 2003	Virtual Tours Videos
16	22-Apr 24-Apr	Case Studies; Review	logen; Dow Cargill	Project 4 Due
17		Final Exam (TBD)		Finals Week