Proposal Form For Addition And Revision Of Courses

1. Proposing College / School: Engineering, Agriculture  
   Department: Biosystems Engineering

2. Course Prefix and Number: BSEN 5230  
   3. Effective Term: Fall 2012

4. Course Title: Waste Management and Utilization for Biosystems  
   Abbreviated Title (30 characters or less): Waste Management & Utilization

5. Requested Action:  
   - [ ] Renumber a Course  
   - [ ] Add a Course  
   - [ ] Revise a Course  
   - [ ] New Course Number: BSEN 4230  
   - [ ] Proposed Course Number: BSEN 5230

6. Course Credit:  
<table>
<thead>
<tr>
<th>Contact/Group Hours</th>
<th>Scheduled Type</th>
<th>Weekly or Per Term?</th>
<th>Credit Hours</th>
<th>Anticipated Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Hours</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(Repeatability):</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Lecture</td>
<td>Weekly</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lab</td>
<td>Weekly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

   Total Credit Hours: 3

7. Grading Type:  
   - [ ] Regular (ABCDF)  
   - [ ] Satisfactory/Unsatisfactory (S/U)  
   - [ ] Audit

8. Prerequisites/Corequisites: 
   Use “P” to indicate a prerequisite, “C” to indicate a corequisite, and “P/C” to indicate a prerequisite with concurrency.  
   P: CHEM 1040, BIOL 3200; P/C: BSEN 3230 or departmental approval

9. Restrictions: List specific restriction in space above.  
   - [ ] College  
   - [ ] Major  
   - [x] Standing  
   - [ ] Degree

10. Course Description: 
   (20 Words or Less; exactly as it should appear in the Bulletin)  
   Introduction to animal waste management problems of confined production systems and characterization of animal waste types. Design of biological treatment and processing systems.

11. May Count Either 
   or

12. Affected Program(s):  
   (Respond “N/A” if not included in any program; attach memorandum if more space is required)  
   Major  
   BS Biosystems Engineering

13. Overlapping or Duplication of Other Units’ Offerings:  
   (If course is included in any other degree program, is used as an elective frequently by other unit(s), or is in an area similar to that covered by another college/school, attach correspondence with relevant unit)  
   - [ ] Applicable  
   - [ ] Not Applicable
14. Justification: 
Course is already being taught, Change is for Accelerated Masters Program

(Include a concise, yet adequate rationale for the addition/revision of the course, citing accreditation, assessments (faculty, graduate, and/or external) where applicable)

15. Resources: 
No additional resources

(Indicate whether existing resources such as library materials, classroom/laboratory space, and faculty appointments are adequate to support the proposed addition/revision; if additional resources are required, indicate how such needs will be met, referencing the appropriate level of authorization -- i.e. Dean -- where necessary; if no additional resources or shifting of resources will be necessary, respond “Not Applicable”)

16. Student Learning Outcomes: 
1. To learn the important aspects of confined animal production on environmental waste problems.
2. To introduce the student to biological treatment systems and utilization techniques involving methane production through anaerobic digestion.
3. To introduce the student to various techniques (thermochemical and biochemical) for biofuels production from animal wastes and agricultural residues.

(State in measurable terms (reflective of course level) what students should be able to do when they have completed this course)

17. Course Content Outline: 

Course Name: Waste Management and Utilization for Biosystems
Prerequisites: CHEM 1040, BIOL 3200
Co-requisite BSEN 3230
Instructors: Drs Yifan Wang and Sushil Adhikari (wangyif@auburn.edu)
Course Time Mondays/Wednesdays: 8:00 a.m. – 8:50 a.m. – Lectures
Thursdays: 12:30 – 3:20 p.m. - Laboratory

Texts or Major Resources

Course Description: Introduction to the animal waste management problems of confined production systems and characterization of animal waste types. Design of biological treatment and processing systems. Introduction to the potential of animal waste and agricultural residues and their characterization in terms of biofuels production. Introduction to the various processes for biofuels production from animal wastes and agricultural wastes. Particular emphasis is placed on state-of-the-art utilization systems with biological energy production through anaerobic digestion receiving major coverage.

Course Objectives: 
1. To learn the important aspects of confined animal production on environmental waste problems.
2. To introduce the student to biological treatment systems and utilization techniques involving methane production through anaerobic digestion.
3. To introduce the student to various techniques (thermochemical and biochemical) for biofuels production from animal wastes and agricultural residues.

Lecture Topics
Week 1: Introduction, animal waste problems and characteristics
Week 2: Water chemistry
Week 3: Ionic equilibrium
Week 4: Animal waste production
Week 5: Biological processes and microbiology
Week 6: Bacterial metabolism
Week 7-8: Anaerobic digestion
Week 9: Mole balances, design of batch and continuous reactors
Week 10-11: Conversion and reactor sizing
Week 12: Rate laws and stoichiometry
Week 13: Isothermal reactor design
Week 14: Collection and analysis of rate data
Week 15: Multiple reactions

Lab Topics
Week 1: Lab Safety
Week 2: Solids determination
Week 3: Water chemistry
Week 4: Quiz
Week 5: Ionic equilibrium
Week 6: Chemical oxygen demand
Week 7: Biochemical oxygen demand
Week 8: Test
Week 9-10: nitrogen, ammonia and organic nitrogen determination
Week 11-13: Anaerobic digestion
Week 14-15: Fermentation

Course Evaluation
Homework 15%
Quiz 5%
Laboratory Report 10%
Mid-Term Examination 30%
Final Examination 30%

Grade Assignment
A = 90 – 100%
B = 80 – 89.9
C = 70 – 79.9
D = 60 – 69.9
F = below 60%

Class Policy Statements:
(a) Class Attendance: It is critical that you attend class regularly to be successful in the course. Class attendance and participation will be taken into consideration in case of a borderline final grade. If you miss a class, it is the student’s responsibility to become informed of any material presented or assignments announced during an absence.
(b) Electronic devices: Only calculators approved by the National Council of Examiners for Engineering and Surveying (NCEES) are permitted for use on exams, quizzes, etc. The following are currently the only calculators permitted: (1) Hewlett Packard – HP 33S, (2) Casio – FX 115MS or FX 115MSPlus (may have SR designation), (3) Texas Instruments – TI 30X IIIS, and (4) Texas Instruments – TI 36X SOLAR. Students may check with the instructor to see if any other calculator may be permitted. Use of other electronic devices with communication capabilities are also prohibited during exam or quiz periods (e.g. computers, cell phones, cameras, PDAs, beepers, pagers, iPods, Zunes, cameras, etc.) If these types of electronic devices are seen in use during the quiz or exam, they may be confiscated and the student may face disciplinary action through the academic honesty policy.
(c) Cell phones: To provide the optimal learning environment for all students, all cellular phones must be turned OFF or otherwise inactivated during class, lab, quiz, and exam periods. Text messaging or emailing during class is prohibited.
(d) Disputes over grades: All grade objections are to be submitted to the instructor in writing no later than one week after an assignment is returned
to the class. Otherwise, grade objections will not be entertained. Grade objections should be very specific; i.e., objections that simply ask that a problem be re-graded without providing detailed explanation will not be considered. The original exam or assignment that corresponds with the objection must be submitted along with the written objection. All reviewed objections are final, and multiple objections for the same assignment by the same student are prohibited.

Auburn University Diversity Statement
Diversity at Auburn University encompasses the whole of human experience and includes such human qualities as race, gender, ethnicity, physical ability, nationality, age, religion, sexual orientation, economic status, and veteran status. These and other socially and historically important attributes reflect the complexity of our increasingly diverse student body, local community, and national population. Diversity is a core value at Auburn University. The Office for Diversity and Multicultural Affairs strives to offer a comprehensive range of exemplary educational programs that foster and sustain an environment that promotes academic excellence, respects differences, and accepts inclusiveness. Auburn University recognizes and values the considerable educational benefits emanating from diversity as we prepare our students for life and leadership in a multicultural world. Students who interact with and learn about people from a variety of backgrounds are more apt to understand, appreciate, and excel in the community they inhabit. In this context, diversity is aligned with Auburn University’s land grant mission of providing its students with a superior education in service to the needs of Alabama, the nation, and the world. More information can be found at www.auburn.edu/diversity/

Academic Honesty Statement:
Academic Honesty Policy: The Auburn University student academic honesty code can be found at https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf. All academic honesty violations or alleged violations of code will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Students with Disabilities Statement:
Disability Accommodations: Students who need special accommodations in class, as provided for by the American Disabilities Act, should arrange a confidential meeting with the instructor during office hours the first week of classes - or as soon as possible if accommodations are needed immediately. You must bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have these forms but need accommodations, make an appointment with The Program for Students with Disabilities, 1244 Halley Center, 844.2096 or follow the steps on the website for the office to request for accommodation (https://fp.auburn.edu/disability/students/requestaccommodations.asp)

(Provide a comprehensive, week-by-week breakdown of course content, including assignment due dates)

18. Assignments / Projects:

Homework 15%
Quiz 15%
Laboratory Report 10%
Mid-Term Examination 30%
Final Examination 30%

(List all quizzes, projects, reports, activities and other components of the course grade -- including a brief description of each assignment that clarifies its contribution to the course’s learning objectives)

19. Rubric and Grading Scale:
A = 90 – 100%
B = 80 – 89.9
C = 70 – 79.9
D = 60 – 69.9
F = below 60%
List all components of the course grade -- including attendance and/or participation if relevant -- with point totals for each; indicate point totals and ranges or percentages for grading scale; for S/U grading, detail performance expectations for a passing grade.

20. Justification for Graduate Credit: N/A

(Include a brief statement explaining how the course meets graduate educational standards (i.e.: rigorous standards for evaluation, development of critical thinking and analytical skills, etc.))

(Included below are standard statements regarding course policies. If necessary, a statement may be altered to reflect the academic policies of individual faculty members and/or the academic unit or department, provided that there is no conflict with the Tiger Cub, Faculty Handbook, or any existing university policy.)

POLICY STATEMENTS

Attendance: Although attendance is not required, students are expected to attend all classes, and will be held responsible for any content covered in the event of an absence.

Excused Absences: Students are granted excused absences from class for the following reasons: illness of the student or serious illness of a member of the student's immediate family, the death of a member of the student's immediate family, trips for student organizations sponsored by an academic unit, trips for university classes, trips for participation in intercollegiate athletic events, subpoena for a court appearance, and religious holidays. Students who wish to have an excused absence from class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request, and render a decision. When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused absences is required. Please see the Tiger Cub for more information on excused absences.

Make-Up Policy: Arrangement to make up a missed major examination (e.g.: hour exams, mid-term exams) due to properly authorized excused absences must be initiated by the student within one week of the end of the period of the excused absence(s). Except in unusual circumstances, such as the continued absence of the student or the advent of university holidays, a make-up exam will take place within two weeks of the date that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins.

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the Tiger Cub will apply to university courses. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Disability Accommodations: Students who need special accommodations in class, as provided for by the Americans With Disabilities Act, should arrange for a confidential meeting with the instructor during office hours in the first week of classes (or as soon as possible if accommodations are needed immediately). The student must bring a copy of their Accommodation Letter and an Instructor Verification Form to the meeting. If the student does not have these forms, they should make an appointment with the Program for Students with Disabilities, 1298 Haley Center, 844-2096 (V/TT).