Course Change Request

Date Submitted: 03/01/18 4:00 pm

Viewing: BAEN 465: Design of Biological Waste Treatment Systems

Last approved: 02/27/18 3:28 am
Last edit: 03/05/18 12:55 pm
Changes proposed by: ashleaschroeder

Catalog Pages referencing this course
BAEN - Biological & Ag Engr (BAEN)
Department of Biological and Agricultural Engineering

Programs referencing this course
BS-CVEN-EN: Civil Engineering - BS, Environmental Engineering Track
BS-EVEN: Bachelor of Science in Environmental Engineering

Contact(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>E-mail</th>
<th>Phone</th>
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</thead>
<tbody>
<tr>
<td>Ashlea Schroeder</td>
<td><a href="mailto:aschroeder@tamu.edu">aschroeder@tamu.edu</a></td>
<td>979-845-0609</td>
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</tbody>
</table>

Rationale for Course

The proposed changes are part of a routine curriculum review.

Course prefix         BAEN        Course number 465
Department            Biological & Agricultural Eng
College/School        Agriculture & Life Sciences
Academic Level        Undergraduate
Undergraduate course level justification (Select One)

Effective term        2018-2019

Complete Course Title Design of Biological Waste Treatment Systems
Abbreviated Course Title DES BIOL WASTE TREAT SYS

Catalog course description
Management and treatment of high organic content wastes, with emphasis on agricultural and food processing wastes; engineering design of biological waste treatment processes; regulatory aspects affecting management of agricultural wastes.

Prerequisites and Restrictions
Grade of C or better in BIOL 113 and CHEM 222, or BAEN 302.

Should catalog prerequisites / concurrent enrollment be enforced? Yes

In Workflow

1. BAEN Department Head
2. Curricular Services Review
3. AG Committee Preparer UG
4. AG Committee Chair UG
5. AG College Dean UG
6. UCC Preparer
7. UCC Chair
8. Faculty Senate Preparer
9. Faculty Senate
10. Provost II
11. President
12. Curricular Services
13. Banner

Approval Path

1. 03/04/18 7:06 pm
   Stephen Searcy (ssearcy): Approved for BAEN Department Head
2. 03/05/18 9:15 am
   Sandra Williams (sandra-williams): Approved for Curricular Services Review
3. 03/05/18 9:40 am
   Dawn Kerstetter (dkerstetter): Approved for AG Committee Preparer UG
4. 03/05/18 12:56 pm
   Bob Knight (bob-knight): Approved for AG Committee Chair UG
5. 03/05/18 1:03 pm
   Kim Dooley (k-dooley): Approved for AG College Dean UG
6. 03/05/18 8:16 pm
   Sandra Williams (sandra-williams): Approved for UCC Preparer
7. 03/09/18 3:30 pm
   Sandra Williams (sandra-williams): Approved for UCC Chair

History

https://nextcatalog.tamu.edu/courseleaf/approve/
Enforced Prerequisites / Concurrent Enrollment

<table>
<thead>
<tr>
<th>And/Or</th>
<th>Course Prefix/Number</th>
<th>Min Grade/Score</th>
<th>Academic Level</th>
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<tr>
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<td>Or</td>
<td>BAEN 302</td>
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</table>

Crosslistings: No

Stacked: Yes

Semester: 3
Credit Hour(s): 3
Contact Hour(s) (per week):
Lecture: 3
Lab: 0
Other: 0
Total: 3

Repeatable for credit? No
CIP/Fund Code: 1403010006
Default Grade Mode: Letter Grade(G)
Method of instruction: Lecture
Will sections of this course be taught as non-traditional? (i.e., parts of term, distance education) Yes

Learning Outcomes

*Meets traditional face-to-face learning outcomes.*

Describe how learning outcomes are met or provide justification why they are not met.

*The learning outcomes are equivalent for on-campus vs. study abroad. Differences will be in the application and comparison of US vs. European practices of biological waste management.*

Hours

*Meets traditional face-to-face hours.*

Describe how hours are met or provide justification why they are not met.

*The total hours in class for the SAP are 48 face-to-face, with 94 hours estimated to be completed outside of class.*

Will this course be taught as a distance education course? No

Is 100% of this course going to be taught in Texas? Yes

Will classroom space be needed for this course? Yes

This will be a required course or an elective course for the following programs:

Required (select program)
Course Syllabus

Syllabus: Upload syllabus
Upload syllabus

BAEN 465 traditional course.docx
BAEN 465 non-traditional course.docx

Letters of support or other documentation

No

Additional information

Reviewer Comments

Sandra Williams (sandra-williams) (02/28/18 12:55 pm): Rollback: You must attach a traditional syllabus and a non-traditional syllabus (if applicable).
Stephen Searcy (ssearcy) (03/01/18 10:38 am): Rollback: sasd
Bob Knight (bob-knight) (03/05/18 12:54 pm): Corrected honor code url.
Sandra Williams (sandra-williams) (03/09/18 3:30 pm): UCC approved March 9 via e-vote.
Course number and title  
BAEN 465 Design of Biological Waste Treatment Systems  
(3+0 = 3 credit hours)

Term  
Spring 2018

Meeting times and location  
12:45 PM – 2:00 PM (TR); PETR 106

Course description  
Engineering design of biological waste treatment processes; management and treatment of domestic, agricultural, and agro-industry wastewater; resource recovery from waste streams; recycle and reuse of finished effluents; regulatory aspects affecting management of agricultural wastes.

Prerequisites: BIOL 113 and CHEM 222, or BAEN 302

Learning outcomes  
At the end of the course, the students should be able to:
1. describe biological wastewater treatment processes
2. develop material balances around biochemical reactors
3. apply biochemical reaction and microbial growth kinetics to wastewater treatment
4. design biochemical reactors to reduce BOD and nutrients in wastewater
5. optimize treatment systems to meet wastewater effluent standards

Instructor information  
Name  
Dr. R. Karthikeyan (“Dr. K”)
Email address  
karthi@tamu.edu
Office location  
303G SCTS
Office hours  
2:30 - 4:00 (T); other times – email for appointment

Name  
Mr. Haoqi Wang
Email address  
haoqiwang@tamu.edu
Office location  
325 SCTS
Office hours  
TBA

Required textbook  

A print copy of the textbook is required for this class.
Additional materials will be provided in class or via email.
Grading
1. In-class assignments (individual effort): 40 points.

Final Grade (100 points maximum) = (100) – (1 × # of unexcused absences).
A: 90-100; B: 80-89; C: 70-79; D: 60-69; and F: <60.

Attendance
Class participation is essential to success in this course. For every unexcused absence, 1 point will be subtracted up to 5 points total from the final grade. (Example: if your final grade is 90 and you were absent for 4 classes unexcused, your final grade will be: 90 – |(1 × 4)| = 86. You will get a B instead of A!). Please refer to http://student-rules.tamu.edu to learn about university excused absences.

We will have a number of in-class assignments. So, maintaining a conducive learning environment is critical. As a courtesy, please turn off and put away your cell phones.

Academic honesty
Aggies do not lie, cheat or steal nor do they tolerate those who do.
The Aggie Code of Honor states that the students at Texas A&M University should value honesty and personal integrity. Therefore, it is the responsibility of students and faculty members to help maintain scholastic integrity at the University by refusing to participate in or tolerate scholastic dishonesty.

It is NOT permissible to copy in-class assignments or problem sets from another student. The penalties for violating this policy will range from a ZERO on the assignment or problem set to an F in the course. In addition, a report will be made to the TAMU Honor Council Office. If you have any questions about the Aggie Honor Code, please consult the website: http://www.tamu.edu/aggiehonor/.

Additional accommodations
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

University regulations
You should familiarize yourself with university regulations and student rules (http://student-rules.tamu.edu/); all relevant rules will be enforced in this class.
Tentative course topics, calendar of activities, and reading assignments*.

<table>
<thead>
<tr>
<th>Week#</th>
<th>Class #</th>
<th>Date</th>
<th>Topic</th>
<th>Reading**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>Chapter 1</td>
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<td>Chapter 2</td>
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<td>2. Reaction kinetics and reactors</td>
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<td>3. Wastewater microbiology</td>
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<td>4. Natural purification processes</td>
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<td>5. Wastewater treatment fundamentals</td>
<td>Chapter 6 &amp; 7</td>
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<td>6</td>
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<td>02/01/2018</td>
<td>WWTP Tour</td>
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<td>6. Suspended growth processes</td>
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<td>02/15/2018</td>
<td>7. Wastewater treatment fundamentals</td>
<td>Chapter 6 &amp; 7</td>
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<td>8. Suspended growth processes</td>
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<td>10. Secondary clarification</td>
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</table>

*I may change the topic lineup and schedule depending on our progress in the semester.

**Please read assigned textbook chapter BEFORE you come to class. In-class quizzes will be given based on the assumption that you have read the assigned chapter before the class.
Guidelines

The philosophy in this course is that each student is encouraged and motivated to learn as much as he or she can by self-study, active in-class learning, working on problem sets, and consulting me outside classroom.

Self-study
You will be assigned reading from the text book and occasionally provided with additional reading materials. These reading assignments will enrich your knowledge in wastewater treatment plant (WWTP) design principles. **You should read the assigned text book chapters BEFORE you come to class.**

In-class learning
Classes will be interactive and active participation is highly recommended. We will go over wastewater treatment design principles and solve design problems in class. Several in-class assignments (15+) will be collected for grading. These assignments are due in class the same day. In-class assignments will range from answering simple questions and working out problems (either closed-book closed-notes or open-book open-notes) to active participation in discussions.

Design problem sets
There will be two design problem sets. Guidelines for the problem sets will be handed out in class. For students enrolled in BAEN 665, one extra problem set will be assigned. Rubric for individual grading will be provided in class.

Final exam
Final exam is comprehensive and open-book (textbook – hard copy).

Overall expectation
It is a senior/graduate level engineering design class; be an inquisitive learner, an active problem solver, and a contributor to discussions. I expect you to handle the work professionally and follow high work ethic. I strongly encourage you meeting with me on a regular basis throughout the semester to discuss design aspects of biological wastewater treatment. This will not only enhance your learning but also help you (*and me!*?) understand the basic concepts better.

Required materials/supplies
1. A print copy of the textbook
2. A pad of engineering paper
3. A mechanical pencil and eraser or a pen
4. A scientific calculator
5. A stapler (*with staples*)
6. A ruler or straight edge
7. A Manila folder to keep all graded assignments
Texas A&M University  
BAEN 465 Design of Biological Waste Treatment Systems  
Course Syllabus – Belgium Study Abroad

Instructor: Dr. Cady Engler  
Email: c-engler@tamu.edu

Course description:  
Engineering design of biological waste treatment processes; management and treatment of domestic, agricultural, and agro-industry wastewater; resource recovery from waste streams; recycle and reuse of finished effluents; regulatory aspects affecting management of agricultural wastes.  
Prerequisites: BIOL 113 and CHEM 222, or BAEN 302

Course Objectives:  
State of the art environmental engineering systems will be studied in this class with a focus on biological systems used for water and waste treatment. U.S. and European practices will be compared. Best management practices (BMPs) for treatment of wastes containing biosolids, including biological treatment processes and land application, and constructed wetlands for waste water treatment and groundwater protection will be presented.

Learning Outcomes:  
At the completion of this course, students should be able to  
1. understand water quality analyses;  
2. determine treatment requirements for utilization of water resources for municipal, agricultural, or industrial uses;  
3. design systems for treating water and wastewater using physical, chemical and biological processes to meet quality standards for municipal, agricultural, or industrial needs or for discharge to the environment;  
4. design systems for treating biosolid wastes to provide economic benefit and minimize environmental impact.

Textbook:  
Extensive notes will be available on the class web page.  

Testing:  
Questions on the tests will be on lecture material, reading assignments, seminars, field trip investigations and homework problems. The grading scale and weighting factors are specified below:

<table>
<thead>
<tr>
<th>Grading</th>
<th>Grading Scale</th>
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<tbody>
<tr>
<td>Exams</td>
<td>35%</td>
</tr>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Design project</td>
<td>5%</td>
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<tr>
<td>Field trip reports</td>
<td>30%</td>
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<tr>
<td>Seminar reports</td>
<td>10%</td>
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<tr>
<td></td>
<td>90 – 100 A</td>
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<td></td>
<td>80 – 89 B</td>
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<td>70 – 79 C</td>
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<td>60 – 69 D</td>
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<td>Below 60 F</td>
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Homework:  
All assignments must be presented in a neat, professional manner. A word processor will be required for all written assignments. Some assignments may require the use of spreadsheets and graphics. Sample calculations will be required for all spreadsheet solutions. All homework assignments are due at the beginning of the class period on the due date.
Field Trip Reports:
Four field trips to tour European technology applied to water resources and waste management in Belgium and the Netherlands will be conducted. A comprehensive field trip report that includes discussion of the water resources or waste treatment technology involved is required for each trip, i.e., each report must include discussion of how the field trip relates to this course. Reporting requirements will be provided in a separate handout.

Seminar Reports:
Two seminars will be presented by EU or Belgian environmental officials relating to this course. A brief report summarizing each seminar, its relationship to the course, and a comparison of practices in Europe with those in the U.S. will be required. Reporting requirements will be provided in a separate handout.

A maximum of half credit will be given for late assignments, unless it falls under the excused absences. Please see http://student-rules.tamu.edu/rule07 for absence information.

Tentative Schedule:

<table>
<thead>
<tr>
<th>CLASS</th>
<th>TOPIC</th>
<th>ESTIMATED TIME (Hr)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>(In Class / Out of Class)</td>
</tr>
<tr>
<td>1</td>
<td>Introduction / Water Quality</td>
<td>3 / 6</td>
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<tr>
<td>2</td>
<td>Wastewater Characteristics, Sedimentation</td>
<td>3 / 6</td>
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<tr>
<td>3</td>
<td>Publicly Owned Treatment Works (POTWs)</td>
<td>3 / 6</td>
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<tr>
<td>4</td>
<td>Field Trip 1</td>
<td>4 / 6</td>
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<tr>
<td>5</td>
<td>Biological Treatment Processes</td>
<td>3 / 6</td>
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<tr>
<td>6</td>
<td>Potable Water Treatment</td>
<td>3 / 6</td>
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<tr>
<td>7</td>
<td>Field Trip 2</td>
<td>4 / 6</td>
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<tr>
<td>8</td>
<td>Biosolid Waste Characteristics, Exam 1</td>
<td>3 / 11</td>
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<tr>
<td>9</td>
<td>Waste Treatment Lagoons</td>
<td>3 / 6</td>
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<tr>
<td>10</td>
<td>Field Trip 3</td>
<td>4 / 6</td>
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<tr>
<td>11</td>
<td>Land Application of Biosolids</td>
<td>3 / 6</td>
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<tr>
<td>12</td>
<td>Energy from Waste, Composting, Constructed Wetlands</td>
<td>3 / 6</td>
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<tr>
<td>13</td>
<td>Field Trip 4</td>
<td>4 / 6</td>
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<tr>
<td>14</td>
<td>Onsite Domestic Wastewater Treatment</td>
<td>3 / 6</td>
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<tr>
<td>15</td>
<td>Final Exam</td>
<td>2 / 5</td>
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</tbody>
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| Total (Hr) | 48 / 94 |

Note: This course has been assigned three credit hours based upon the work represented by verifiable student achievement of institutionally established learning outcomes, direct faculty instruction, and academically engaged time. (Federal Rule GEN 11-06).

Additional Accommodations:
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services at the White Creek complex on west campus or call 845-1637. For additional information visit http://disability.tamu.edu. If any student in this class requires accommodation related to a unique circumstance, please make an appointment to see me as soon as possible. Appropriate arrangements will be made.

Academic Integrity:
“An Aggie does not lie, cheat, or steal, or tolerate those who do.” Please see the Aggie Honor System Office web site at http://aggiehonor.tamu.edu for rules and procedures regarding academic integrity.