Curriculum Committee Revisions Proposal

Wilkes University Curriculum Committee
PROPOSAL SUBMITTAL FORM

1. Originator:  Brian E. Whitman
   Environmental Engineering and Earth Sciences
   408-4882  brian.whitman@wilkes.edu

2. Proposal title: Addition of an Environmental Microbiology course to the Environmental Engineering Program

3. Check only one type of proposal:
   ✔ Program Revision
   ☐ General Education Core Revision
   ☐ New Program
   ☐ Elimination of Program
   ☐ Course Revisions Only (i.e. none of the above)

4. Is this proposal linked to another originator's proposal?  No

5. Indicate the number of course modification forms that apply to this proposal:
   __1__ Course Addition Form
   ___2___ Course Deletion Form
   __1__ Course Change Form

6. Required Signatures:  Agree/Disagree:
   
   Marleen Troy   Agree 3/22/10

   Dale Bruns   Agree 3/29/10

   Susan Hritzak   Agree 3/26/10
Curriculum Committee Revisions Proposal

Wilkes University Curriculum Committee
DOCUMENTATION REQUIRED FOR A
PROGRAM OR CORE REVISION/ADDITION/ELIMINATION

1. Title of Proposal: Addition of Environmental Microbiology to the Environmental Engineering Program

2. Summary of Proposal:
A result of the 2009 ABET accreditation visit for the Environmental Engineering Program was the need for basic concepts in the biological sciences be added to the curriculum. Although basic concepts in biological principles are covered in several required environmental engineering courses that are taught throughout the four years of Environmental Engineering Program, it was identified that a course covering biological concepts such as environmental microbiology be added to the curriculum. The EEES faculty has carefully considered and addressed this issue and concluded an Environmental Microbiology course (1 credit) be added to the third semester of the Environmental Engineering Program, and the required number of credits for ENV 332 Air Quality be reduced by one credit. The total number of required credits in the program is unchanged.

3. Academic Explanation for Proposal:
An environmental engineer must have a broad array of technical knowledge, skills, and abilities. One area of focus is fundamental knowledge in the biological sciences. An environmental engineer must have the background to apply scientific and engineering principles to protect the human population and organisms in the environment from potentially harmful biological and chemical agents, and be able to use biological systems for the treatment of polluted systems. The environmental engineering curriculum is designed to have biological concepts taught in many required courses that are found in all four years of the program. This allows for biological concepts to be reinforced throughout the program, and emphasizes how biological concepts are used in many broad areas of environmental engineering.

Environmental microbiology is one main area of biology that is common in many environmental systems that are studied or designed by environmental engineers. Environmental microbiology is closely related to microbial ecology, which would be taught in a traditional microbiology course; however, the emphasis in environmental microbiology is on how microorganisms can be used to benefit society either by protecting human populations or the environment, or using microorganism to treat polluted air, water, or soil systems. Thus these fields are related but not synonymous since they focus on different viewpoints and address different problems.

By adding a one-credit environmental microbiology course during the third semester, environmental engineering students will be shown environmental microbiological concepts independent of other course objectives and outcomes, so these concepts can be specifically explored in soil, water, and air systems for which the students have some background in from EES 202 Biogeochemistry. Also, these concepts can then be applied in the upper-level environmental engineering design courses to better understand how biological systems are used for treatment processes.
4. Specific Issues to be Addressed:
What would be the effect on the curriculum of all potentially affected programs if this proposal were adopted? Include any potential effects to the curriculum of current programs, departments and courses.

The effect would be the addition of a one-credit ENV 205 Environmental Microbiology course in the third semester of the Environmental Engineering Program, and the number of credits for ENV 332 Air Quality will be reduced from 4 credits to 3 credits. The total required number of credits for the program will be unchanged.

5. Required Support Documentation:
   a. Proposal Submittal Form: Attached on top
   b. Any required course modification forms: The Course Addition and Course Change forms are attached.
   c. A semester-by-semester program outline as it would appear in the bulletin for a new program or any modified program with all changes clearly indicated is attached. The only program modifications are found in Semesters 3 and 6: ENV 205 Environmental Microbiology (1 credit) was added to the third semester, ENV 332 Air Quality was reduced to 3 credits in the sixth semester, and the Distribution Requirement (3 credits) course was moved from the third to the sixth semester to balance the number of credits for each semester. All changes are in Bold Italics.

6. Signatures and Recommendations to Obtain:

Marleen Troy

Dale Bruns

Reynold Verret
# Environmental Engineering
## Recommended Course Sequence for a B.S. Degree in Environmental Engineering

### First Semester
- CHM 113 Elements and Compounds Lab  
- CHM 115 Elements and Compounds  
- MTH 111 Calculus I  
- ME 180 CADD Lab  
- ENG 101 Composition  
- FYF 101 First-Year Foundations  

### Second Semester
- EES 202 Biogeochemistry or  
- EGR 200 Intro. To Materials Science  
- MTH 112 Calculus II  
- CS 125 Computer Science I or  
- EGR 140 Computers in Engineering  
- PHY 201 General Physics I  
- Distribution Requirement  

### Third Semester
- MTH 211 Intro to Differential Equations  
- PHY 202 General Physics II  
- EE 211 Electrical Circuits and Devices  
- EE 283 Electrical Measurements Lab  
- ME 231 Statics & Dynamics  
- ENV 205 Environmental Microbiology  

### Fourth Semester
- EES 211 Physical Geology  
- ME 322 Engineering Thermodynamics  
- EES 240 Principles of Environmental Science  
- ME 232 Strength of Materials  
- Distribution Requirement  

### Fifth Semester
- ENV 315 Soils  
- ENV 321 Hydrology  
- ME 321 Fluid Mechanics  
- Distribution Requirement  
- ME 323 Fluid Mechanics Lab  
- Technical Elective [1]  

### Sixth Semester
- ENV 330 Water Quality  
- ENV 332 Air Quality  
- EgM 320 Engineering Project analysis  
- EGR 201 Professionalism and Ethics [2]  
- Technical Elective [1]  
- Distribution Requirement  

### Seventh Semester
- ENV 305 Solid Waste Management  
- ENV 351 Water and Wastewater Treatment  
- ENV 353 Air Pollution Control  
- ENV 391 Senior Projects I  
- Distribution Requirement  
- Technical Elective [1]  

### Eighth Semester
- ENV 322 Water Resources Engineering  
- ENV 352 Environmental Engineering Hydraulics  
- ENV 354 Hazardous Waste Management  
- ENV 392 Senior Projects II  
- Technical Elective [1]  
- Distribution Requirement  

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[1] Advisor-approved science or engineering courses numbered 200 or above with at least one course in engineering. Technical electives must include either EES 271 or EES 272.

[2] Consult with advisor for availability and proper scheduling. May be taken on campus, at other institutions and/or off campus as an independent study or distance learning course.
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COURSE ADDITION FORM

Course Title: Environmental Microbiology

Course Number: Proposed: ENV 205

Course Credit Hours:

Classroom Hours 1  Lab Hours  Other

Course Prerequisites: None

Course Description (as proposed for the Bulletin): The foundational concepts in microbiology that are important in environmental systems will be explored in this course. This will include the function and formation of cellular components starting from basic molecules (carbohydrates, fatty acids, amino acids, and nucleotides) to the cellular structures that are formed (membranes, proteins, and the nucleic acids RNA & DNA); carbon, energy, and nutrient sources required for cellular growth; and the metabolic pathways for substrates common in environmental systems will be shown. Biodegradation and growth kinetic models will be introduced.

List All Potentially Affected Programs: B.S. in Environmental Engineering

Explanation for Course Addition: See Program Revision Proposal bullet 3

Required Documentation: Example of a syllabus is attached.

Signatures to Obtain:

Marleen Troy  3/25/10
Dale Bruns
Susan Hritzak  3/26/10
Environmental Microbiology
ENV 205
Fall XXXX

Dr. Brian E. Whitman
Office: SLC 250
Phone: 408-4882
E-mail: brian.whitman@wilkes.edu

Office Hours: M, T, W from 9:30 to 10:30
or by appointment

Textbook: Class Handouts

Catalog Description:
The foundational concepts in microbiology that are important in environmental systems will be explored in this course. This will include the function and formation of cellular components starting from basic molecules (carbohydrates, fatty acids, amino acids, and nucleotides) to the cellular structures that are formed (membranes, proteins, and the nucleic acids RNA & DNA); carbon, energy, and nutrient sources required for cellular growth; and the metabolic pathways for substrates common in environmental systems will be shown. Biodegradation and growth kinetic models will be introduced. Prerequisites: None

General Course Objectives:
1. Students will define a “living” cell and describe carbon, energy, and nutritional requirements
2. Students will identify cellular components and describe their function
3. Students will demonstrate the link between growth and substrate degradation kinetics
4. Students will identify metabolic pathways and their relationship to energy needs

Course Outcomes and Assessment:
The Accreditation Board for Engineering and Technology (ABET) Criteria 2000 define a number of program outcomes that all graduates of ABET accredited engineering programs must have. These outcomes are available to any interested person and can be found at www.abet.org or I will provide a list of the outcomes if requested. This course is designed to address some of these outcomes as defined below.

Outcome a, an ability to apply knowledge of mathematics, science and engineering, is demonstrated throughout the course. The foundational concepts in environmental microbiology and how they relate to systems common in environmental engineering are the focus of the course.
Outcome i, recognition of the need for and an ability to engage in lifelong learning, will be addressed by providing articles that includes concepts of environmental microbiology that are not covered in this course.
Outcome j, knowledge of contemporary issues, is addressed by providing to the students recent professional literature as I receive it that covers any aspect of environmental microbiology.

Course Rules:
1. All homework assignments are due when indicated. If you anticipate submitting an assignment late, you must receive permission from me and provide a specific time for when an assignment will be submitted. All unexcused late assignments will receive a maximum of 50% of the possible points and will not be accepted after 48 hours of the due date.
2. Lecture and related material from handouts are subject to be a topic question on any exam.
3. Exams will be closed book unless stated otherwise. Mid-term exams will cover the material stated. The final exam will cover the entire course.

Grading System:
Homework Assignments 50%
Attendance and Participation 10%
Mid-term exam (1) 20%
Final Exam 20%
Guaranteed Grade:

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Lecture Topics:
- Definition of a "living cell" and "microorganism"
- Fundamental requirements for a "living" cell (carbon, energy, nutrient sources)
- General structure and function of cellular components
- Size, shape, and mobility of bacteria
- Microbial growth and kinetics
- Biodegradation kinetics
- Enzyme function and kinetics
- Microbial metabolism
### Wilkes University Curriculum Committee

#### COURSE CHANGE FORM

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<th>1. Course Title</th>
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<td><strong>Course Title</strong></td>
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| 2. Course Number                | ENV 332 |

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<td>Other</td>
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| 4. Course Prerequisites    | CHM 116 or EES 202, EES 240 |
|                          | CHM 116 or EES 202, EES 240 or permission of the instructor |

| 5. Course Description      | Study of atmospheric pollutants, their sources and effects; measurement and monitoring techniques for air pollutants; atmospheric chemical transformations; regulatory control of air pollution; meteorology of air pollution; transport and dispersion of air pollutants; and introduction to indoor air pollution. Lab work includes both problem-oriented and hands-on exercises. Exercises include basic gas concepts; volume measuring devices; flow, velocity and pressure measuring devices; calibration of such devices; various sampling techniques. Three hours lecture and a three hour-lab per week. |
|                          | Study of atmospheric pollutants, their sources and effects; measurement and monitoring techniques for air pollutants; atmospheric chemical transformations; regulatory control of air pollution; meteorology of air pollution; transport and dispersion of air pollutants; and introduction to indoor air pollution. Lab work includes both problem-oriented and hands-on exercises. Exercises include basic gas concepts; volume measuring devices; flow, velocity and pressure measuring devices; calibration of such devices; various sampling techniques. Two hours lecture and a three hour-lab per week. |

| 6. List All Potentially Affected Programs | BS in Earth & Environmental Sciences  
BA in Earth & Environmental Sciences  
BS in Environmental Engineering |
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7. **Explanation of proposed change.** Topics for learning and discussion such as those relating to measurement of air pollutants and dispersion modeling will be focused mostly in a laboratory setting.

8. **Signatures to Obtain:**

   - Marleen Troy
   - Dale Bruns
   - Susan Hritzak

   **Signature Dates:**
   - Marleen Troy
   - Dale Bruns
   - Susan Hritzak

   **Date:** 3/28/10