**Proposal Form For Addition And Revision Of Courses**

1. **Proposing College / School:** College of Agriculture  
   **Department:** Agronomy & Soils

2. **Course Prefix and Number:** AGRN 5063/6066  
   **3. Effective Term:** Fall 2010

4. **Course Title:** Soil Microbiology Lecture  
   **Abbreviated Title (30 characters or less):**

5. **Requested Action:**  
   - [ ] Renumber a Course  
   - [x] Add a Course  
   - [ ] Revise a Course
   **Current Course Number:**  
   **Proposed Course Number:**
   **Type of Revision:**

6. **Course Credit:**  
   **Maximum Hours (Repeatability):** 3
<table>
<thead>
<tr>
<th>Contact/Group Hours</th>
<th>Scheduled Type</th>
<th>Weekly Credit</th>
<th>Anticipated Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>per term</td>
<td>3</td>
</tr>
</tbody>
</table>
   **Total Credit Hours:** 3

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

8. **Prerequisites, Co-Requisites:**  
   **Prerequisite(s):** BIOL 3200 or dept. approval (undergraduates)  
   **Co-Requisite(s):**
   **Pre/Co-Requisite(s):**

9. **Restrictions:**  
   - [ ] College  
   - [ ] Major  
   - [ ] Standing  
   - [ ] Degree

10. **Course Description:**
    (20 Words or Less; exactly as it should appear in the Bulletin)
    Ecology, physiology, and biochemistry of soil microorganisms with emphasis on soil microbial processes that are important to environmental quality and soil productivity.

11. **May Count Either:**
    AGRN5060/6060[ ] or AGRN5063/6066[ ]
    **Program Type (e.g.: minor, major, etc.)**
    **Program Title (e.g.: MS in Chemistry, Performance Option, Minor in Art)**
    **Requirement or Elective?**

12. **Affected Program(s):**
    (Respond “NA” if not included in any program)
    **NA**

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:
- To provide academic credentials to students and professionals who are interested in furthering academic achievement and advancement of their careers;
- To provide non-traditional students (e.g., professionals and international students) the opportunity to take Soil Microbiology via the distance learning environment;
- To provide an opportunity for on-campus students who are unable to take the on-campus course due to scheduling conflicts to take Soil Microbiology online.

(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:
- ACES/Ag IT
- DLOT
- Some additional hours on the part of the faculty member to convert course materials for the distance learning environment (example - course lectures converted to voiceover Powerpoint)

(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:
To acquire knowledge regarding types and functions of microorganisms in terrestrial ecosystems.

(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:
see attached syllabus

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

18. Assignments / Projects:
see attached syllabus

(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:
see attached syllabus

(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:
See attached syllabus and grading scale. Graduate students are required to write a five-page research proposal and provide peer review comments to a proposal written by one classmate. Graduate students will also have more essay questions on the exams.

(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.)

REQUIRED 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, 128B Haley Center, 844-2096 (VTT).
Rationale for
AGRN 5063/6066 Soil Microbiology (3 credits)
Fall Semester 2010

Instructor: Dr. Yucheng Feng  
Phone: 844-3967  
Email: yfeng@auburn.edu  
Office: 228 Funchess Hall, Auburn University main campus

Virtual Office Hours: I will be available online on Fridays from 1 to 3 PM using chat and email. I will also be available by phone during the same time period.

Prerequisite: Biol 3200 or departmental approval  
The prerequisite for this course is General Microbiology (Biol 3200). Distance education students may take a similar course from another university to satisfy this prerequisite. For the latter case, departmental approval is needed prior to class registration.

Course Overview:

This is a piggyback course targeting upper level undergraduate students and graduate students. Soil microbiology covers topics related to ecology, physiology, and biochemistry of soil microorganisms with emphasis on soil microbial processes that are important to environmental quality and soil productivity.

Course outline:

1. Introduction
2. Soil as a habitat for organisms
3. Components of the soil biota  
   • Bacteria and archaea  
   • Fungi  
   • Eukaryotic algae and cyanobacteria  
   • Protozoa and nematodes  
   • Viruses
4. Distribution of microorganisms in soil
5. Interactions between soil organisms
6. Methods of studying soil microorganisms  
   • Soil samples  
   • Numbers of microorganisms  
   • Microbial biomass  
   • Microbial activity  
   • Microbial diversity
7. Carbon transformations and soil organic matter  
   • Global carbon cycle  
   • Organic carbon inputs to soil and their degradation  
   • Soil organic matter
8. The nitrogen cycle  
   • Immobilization/mineralization  
   • Nitrification  
   • Denitrification  
   • Nitrogen fixation
9. Biodegradation and bioremediation  
   • Metabolism of toxic organic chemicals  
   • Bioremediation of contaminated soils
Activities:

The on-campus course is offered in a combined lecture and lab format, whereas lectures and labs are divided into two separate courses for distance education purpose. Due to the biosafety regulations and equipment needs of the labs, it is very difficult for distance education students to complete the lab exercises on their own off-campus. The five-day on-campus visit, however, may prevent students residing in remote locations and other countries from taking Soil Microbiology if the lectures and lab were combined. Separation of the lectures and labs will give students who cannot travel to campus the flexibility of taking the lecture portion of the course alone, and thus allow for higher student enrollments in the lecture only course. For additional information, please see the syllabus and rationale for Soil Microbiology Lab course.

The lecture portion of on-campus Soil Microbiology course and the distance education Soil Microbiology Lecture are almost identical in content and evaluation. The on-campus students have face-to-face lectures in a classroom setting, whereas distance education students watch the same Powerpoints slides with narration by the instructor. All students will have access to lecture slides, lecture outline, and other handouts posted on Blackboard. Additional reading materials will be available to all students through E-reserve from the library.

Both on-campus and distance education students will take two midterm exams and one final exam. The distance education students will take proctored exams online, but the material covered will be identical with the exception of material covered in the lab exercises. Since the on-campus course is offered in a combined lecture and lab format, on-campus course exams include topics covered in lectures and labs. For distance education students, laboratory exercises take place in a separate lab course and will be tested in a separate written exam.

Assignments:

Each student will be responsible for giving an oral presentation. Individual students will select a research paper published within the past five years dealing with an aspect of soil microbiology. They will read and critique the selected paper, and give a 12-minute presentation using WIMBA Liveclassroom through Blackboard. There will be a three-minute question-and-answer period after each presentation. Questions from the classmates and instructor can be posted on the discussion board. Students in the audience will fill out an evaluation sheet provided by the instructor.

Graduate students in the class are required to write a five-page research proposal. Additionally, they need to provide a written review for a classmate’s draft proposal. Each graduate student then has an opportunity to revise their own proposal based on the feedback from their classmate and instructor before turning in their final proposal.

Methods students will use to interact with the professor:

Students will study the narrated Powerpoint slides and watch demonstration provided by the instructor. They will be able to communicate with the instructor via the following means: 1) telephone during regular work hours, 2) email at anytime, 3) specified virtual hours during which the instructor will be available via chat and email, and, 4) Blackboard discussion board.

Evaluation:

Exams and assignments will be evaluated in a same manner for on-campus and distance education students other than the laboratory activities, which are covered in a separate course for distance education students. All three exams for the distance education course are to be proctored. The proctored exams may be administered via Blackboard to the distance education students. Please see
the information for exam proctoring at the Distance Learning web site:
http://www.auburn.edu/distance_learning/programs/dlot_il/forms.php

The total points to be earned for this distance education course and the lecture portion of the
campus course will be the same for both on-campus and distance education students. Graduate
students are required to write a research proposal and provide peer review comments to a classmate.
Graduate students will also have more essay questions on the exams than undergraduate students.

**Course Description, Objective, Textbook, Grading, and Policy:**

See the syllabus.
AGRN 5063/6066 Soil Microbiology Lecture (3 credits)
Fall Semester 2010
(Prerequisite: Biol 3200 or departmental approval)

Instructor: Dr. Yucheng Feng
Phone: 844-3967
Email: yfeng@auburn.edu
Office: 228 Funchess Hall, Auburn University main campus

Virtual Office Hours: I will be available online on Fridays from 1 to 3 PM using chat and email. I will also be available by phone during the same time period.

Course Description: Ecology, physiology, and biochemistry of soil microorganisms with emphasis on soil microbial processes that are important to environmental quality and soil productivity.

Course Objective: To acquire knowledge regarding types and functions of microorganisms in terrestrial ecosystems.

Recommended Textbook:

Additional Reading Materials (Relevant chapters will be available on E-reserve):


Grading:
Undergraduate Students:
Grades will be based on examinations, participation in class discussion board, and an oral presentation via WIMBA Liveclassroom on Blackboard (presentation-30 pts, evaluation-10 pts). The oral presentations will be evaluated by the instructor as well as your classmates.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two mid-term exams</td>
<td>200</td>
</tr>
<tr>
<td>Final exam</td>
<td>120</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>40</td>
</tr>
<tr>
<td>Participation in chat-room class discussion</td>
<td>20</td>
</tr>
</tbody>
</table>
Graduate Students:
Grades will be based on examinations, participation in class discussion board, an oral presentation via WIMBA Liveclassroom in Blackboard (presentation-30 pts, evaluation-10 pts), and a research proposal. The oral presentations will be evaluated by the instructor as well as your classmates. You are expected to provide peer review comments for one of your classmates’ research proposals.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two mid-term exams</td>
<td>200</td>
</tr>
<tr>
<td>Final exam</td>
<td>120</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>40</td>
</tr>
<tr>
<td>Participation in chat-room class discussion</td>
<td>20</td>
</tr>
<tr>
<td>Research proposal</td>
<td>90</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>470</strong></td>
</tr>
</tbody>
</table>

Grade scale: >90% = A, 80~89% = B, 70~79% = C, 60~69% = D, <60% = F

Exam Schedule:

- Midterm exam 1: Friday, February 11
- Midterm exam 2: Wednesday, March 23
- Final exam: To be announced

All the exams are to be proctored. Examples of approved proctors are: academic administrators in the learner's locale (school superintendents, principals, academic deans, department heads at colleges), position supervisor or military officer. All proposed proctors are verified for appropriateness by the Distance Learning and Outreach Technology (DLOT) Student Service staff at 334-844-3151, or audl@auburn.edu. At the time of each examination, the proctor and student need to fill out the Examination Information Verification form. The proctored exams may be administered via Blackboard to the distance students. Please see the information for exam proctoring at the Distance Learning web site: [http://www.auburn.edu/distance_learning/programs/dlot_il/forms.php](http://www.auburn.edu/distance_learning/programs/dlot_il/forms.php)

Course Policy:

Students are expected to follow the course schedule, complete all course readings and assignments, and participate in discussions through Blackboard. Students are responsible for all materials presented in the course.

Make-Up Policy: Arrangement to make up a missed major examination (e.g., mid-term exams) due to properly authorized excused absences must be initiated by the student within one week of the scheduled exam period. 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, as provided for by the Americans With Disabilities Act, should contact the instructor in the first week of classes (or as soon as possible if accommodations are needed immediately). The student must have a copy of their Accommodation Letter and an Instructor Verification Form. If the student does not have these forms, they should contact the Program for Students with Disabilities, 1288 Haley Center, 844-2096 (V/TT).

**Course Contents:**

You are expected to follow lecture presentations in the form of voiceover PowerPoint slides, complete the assigned textbook readings, answer online questions, and view demonstrations performed by the instructor.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>2</td>
<td>Soil as a habitat for organisms</td>
</tr>
<tr>
<td>3</td>
<td>Components of the soil biota–Bacteria and Archaea</td>
</tr>
<tr>
<td>4</td>
<td>Components of the soil biota–Fungi and other eukaryotes</td>
</tr>
<tr>
<td>5</td>
<td>Components of the soil biota–Viruses. Distribution of microorganisms in soil</td>
</tr>
<tr>
<td>6</td>
<td><strong>Exam 1.</strong> Interactions between soil organisms</td>
</tr>
<tr>
<td>7</td>
<td>Methods of studying soil microorganisms</td>
</tr>
<tr>
<td>8</td>
<td>Methods of studying soil microorganisms</td>
</tr>
<tr>
<td>9</td>
<td>Carbon transformations and soil organic matter</td>
</tr>
<tr>
<td>10</td>
<td>The nitrogen cycle–Immobilization/mineralization, Nitrification, and Denitrification</td>
</tr>
<tr>
<td>11</td>
<td><strong>Exam 2.</strong> The nitrogen cycle–Nitrogen fixation</td>
</tr>
<tr>
<td>12</td>
<td>Spring break</td>
</tr>
<tr>
<td>13</td>
<td>The nitrogen cycle–Nitrogen fixation.</td>
</tr>
<tr>
<td>14</td>
<td>Biodegradation and bioremediation–Processes, Biodegradability, NPL sites</td>
</tr>
<tr>
<td>15</td>
<td>Biodegradation and bioremediation–General metabolism, Hydrocarbon, Pesticides</td>
</tr>
<tr>
<td>16</td>
<td>Biodegradation and bioremediation–TCE &amp; PCE, PCBs, remediation strategies</td>
</tr>
<tr>
<td>17</td>
<td><strong>Final Exam</strong></td>
</tr>
</tbody>
</table>
Oral Presentation Assignment

Select a research paper published within the past five years dealing with an aspect of soil microbiology. Critically examine experimental methods and approaches used, and give a 12-minute presentation. There will be 3 minutes for questions after the presentation.

The following is a list of suggested journals. You may select a paper from a journal not listed below.

For Biodegradation and Bioremediation:

- Applied and Environmental Microbiology
- Environmental Science and Technology
- Environmental Microbiology
- Applied Microbiology and Biotechnology
- Biodegradation
- Journal of Environmental Quality

For Agriculture:

- Soil Biology and Biochemistry
- Soil Science Society of America Journal
- Biology and Fertility of Soils
- Plant and Soil

For Microbial Ecology:

- The ISME Journal
- Applied and Environmental Microbiology
- Soil Biology and Biochemistry
- Microbial Ecology
- FEMS Microbiology Ecology
On-campus Course Syllabus

AGRN 5060/6060 Soil Microbiology
(4 credits)
Spring 2008
(Prerequisite: Biol 3200)

Instructor: Yucheng Feng; phone: 844-3967, email: yfeng@auburn.edu
Teaching Assistant: To be announced

Office hours: F 1 – 3, 228 Funchess Hall, or by appointment

Lectures: MWF 12-12:50, 243 Funchess Hall


Course Objectives:

To acquire knowledge regarding types and functions of microorganisms in terrestrial ecosystems.

Recommended Textbook:


Additional Reading Materials:


Exam Schedule:

Midterm exam 1 Monday, February 11
Midterm exam 2 Monday, March 24
Final exam Thursday, May 1, 2 pm – 4:30 pm
Grading:

*Undergraduate Students:*
Grades will be based on examinations, participation in class discussion, an oral presentation (presentation-30 pts, evaluation-10 pts), and laboratory exercises (lab performance-60 pts and lab notebook-60 pts). You are required to turn in your lab notebook on April 18, 2008. Oral presentations will be evaluated by the instructor as well as your classmates.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two mid-term exams</td>
<td>200</td>
</tr>
<tr>
<td>Final exam</td>
<td>120</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>40</td>
</tr>
<tr>
<td>Laboratory</td>
<td>120</td>
</tr>
<tr>
<td>Participation in class discussion</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>500 points</strong></td>
</tr>
</tbody>
</table>

*Graduate Students:*
Grades will be based on examinations, participation in class discussion, an oral presentation (presentation-30 pts, evaluation-10 pts), a research proposal, and laboratory exercises (lab performance-60 pts and lab notebook-60 pts). You are required to turn in your lab notebook on April 18, 2008. Oral presentations and research proposals will be evaluated by the instructor as well as your classmates.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two mid-term exams</td>
<td>200</td>
</tr>
<tr>
<td>Final exam</td>
<td>120</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>40</td>
</tr>
<tr>
<td>Laboratory</td>
<td>120</td>
</tr>
<tr>
<td>Participation in class discussion</td>
<td>20</td>
</tr>
<tr>
<td>Research proposal</td>
<td>90</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>590 points</strong></td>
</tr>
</tbody>
</table>

Grade scale: ≥90% = A, 80~89% = B, 70~79% = C, 60~69% = D, <60% = F

Course Policy:

Students are expected to attend all lectures and labs and are responsible for all materials presented in them. Makeup exams will be scheduled only for those students who provide a valid written excuse prior to the exam.

The University Academic Honesty Code will be enforced (see Tiger Cub for detail).

Students requiring special accommodations in class should contact The Program for Students with Disabilities (1244 Haley Center, 844-2096) to obtain a copy of Accommodation Memo. Please meet with the instructor as soon as possible and bring a copy of your Accommodation Memo and an Instructor Verification Form.
Course Outline:

1. Introduction
2. Soil as a habitat for organisms
3. Components of the soil biota
   • Bacteria and archaea
   • Fungi
   • Eukaryotic algae and cyanobacteria
   • Protozoa and nematodes
   • Viruses
4. Distribution of microorganisms in soil
5. Interactions between soil organisms
6. Methods of studying soil microorganisms
   • Soil samples
   • Numbers of microorganisms
   • Microbial biomass
   • Microbial activity
   • Microbial diversity
7. Carbon transformations and soil organic matter
   • Global carbon cycle
   • Organic carbon inputs to soil and their degradation
   • Soil organic matter
8. The nitrogen cycle
   • Immobilization/mineralization
   • Nitrification
   • Denitrification
   • Nitrogen fixation
9. Biodegradation and bioremediation
   • Metabolism of toxic organic chemicals
   • Bioremediation of contaminated soils
### Lab Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lab</th>
<th>Lab Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/10</td>
<td>0</td>
<td>No lab</td>
</tr>
<tr>
<td>2</td>
<td>1/17</td>
<td>0</td>
<td>No lab</td>
</tr>
<tr>
<td>3</td>
<td>1/24</td>
<td>1</td>
<td>The compound microscope and gram-staining techniques</td>
</tr>
<tr>
<td>4</td>
<td>1/31</td>
<td>2</td>
<td>Enumeration of soil bacteria, actinomycetes, and fungi</td>
</tr>
<tr>
<td>5</td>
<td>2/7</td>
<td>2</td>
<td>Enumeration (cont’d), set up next lab</td>
</tr>
<tr>
<td>6</td>
<td>2/14</td>
<td>3</td>
<td>Microbial biomass by fumigation-incubation</td>
</tr>
<tr>
<td>7</td>
<td>2/21</td>
<td>3</td>
<td>Microbial biomass by fumigation-incubation (continued)</td>
</tr>
<tr>
<td>8</td>
<td>2/28</td>
<td>4</td>
<td>Phosphatase activity in soil</td>
</tr>
<tr>
<td>9</td>
<td>3/6</td>
<td>5</td>
<td>Extraction of soil DNA</td>
</tr>
<tr>
<td>10</td>
<td>3/13</td>
<td>6</td>
<td>Nitrification and denitrification by soil bacteria. Soil DNA (continued)</td>
</tr>
<tr>
<td>11</td>
<td>3/20</td>
<td></td>
<td>Spring break</td>
</tr>
<tr>
<td>12</td>
<td>3/27</td>
<td>6</td>
<td>Nitrification and denitrification by soil bacteria (continued)</td>
</tr>
<tr>
<td>13</td>
<td>4/3</td>
<td>7</td>
<td>Symbiotic nitrogen fixation</td>
</tr>
<tr>
<td>14</td>
<td>4/10</td>
<td>7</td>
<td>Symbiotic nitrogen fixation (continued)</td>
</tr>
<tr>
<td>15</td>
<td>4/17</td>
<td>0</td>
<td>No lab</td>
</tr>
<tr>
<td>16</td>
<td>4/24</td>
<td></td>
<td>Student presentations</td>
</tr>
</tbody>
</table>
Oral Presentation Assignment

Select a recent research paper (2003 – 2008) dealing with an aspect of soil microbiology. Critically examine experimental methods and approaches used, and give a 12-minute presentation. There will be 3 minutes for questions after the presentation.

The following is a list of suggested journals. You may select a paper from a journal not listed below.

For Biodegradation and Bioremediation:

- Applied and Environmental Microbiology
- Environmental Science and Technology
- Environmental Microbiology
- Applied Microbiology and Biotechnology
- Biodegradation
- Journal of Environmental Quality

For Agriculture:

- Soil Biology and Biochemistry
- Soil Science Society of America Journal
- Biology and Fertility of Soils
- Plant and Soil

For Microbial Ecology:

- The ISME Journal
- Applied and Environmental Microbiology
- Soil Biology and Biochemistry
- Microbial Ecology
- FEMS Microbiology Ecology