EVS 5027- Environmental Microbiology
School of the Environment (SoE)
Florida A&M University
Spring Semester 2013

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SoE Mission Statement

The objectives of the School of the Environment (SoE) are to provide instruction, conduct research, perform public services and initiate technology transfer which will result in the development of remedies for existing environmental problems; the enlightenment of communities on environmental science issues; and the production of students uniquely prepared to address present and future environmental science concerns. SoE fosters the development of students by emphasizing rigorous academic course work; student involvement in faculty research; community service; and student involvement in collaborative research efforts with other universities, community/junior colleges, national laboratories, regulatory agencies and corporate environmental contractors.

Course Description

FAMU Catalog Description: This course is designed to examine the relationship between microbes and the environment and the use of microbes in environmental cleanup. Discussions will focus on the use of molecular biology techniques to analyze and classify microbial life forms, as well as the use of these techniques to design and construct unique microbial cells that can be used to achieve specific objectives related to management of the environment.

Prerequisite(s):	Students should have a good working knowledge of microbiology, biochemistry and molecular biology.
Core curriculum course:	No
Course restrictions:	None
Availability to non- SoE Students:	Yes

Course Objectives

This course is designed to have you learn about micro-organisms that are found in various environmental settings, how molecular biology techniques are used to identify and classify microbial life forms, factors that govern growth of microbial life forms and some of the applied uses of environmental microorganisms.

Methodology: Students will learn from class handouts and reading of original research articles. The textbook is to be used to provide basic information in biology, chemistry and microbiology.

Learning Materials

Text: Environmental Microbiology, Second Edition by Raina M. Maier, Ian L. Pepper, Charles P. Gerba. Academic Publishers, ISBN- 978-0-12-370519-8, 2009.
Articles: Distributed in class
Handouts: Distributed in class
Video resources: None

Some pertinent information and helpful hints:

1) Please read the appropriate text chapters prior to class so that you are able to follow course discussions.
2) Please rewrite your notes right after class; this will give you an opportunity to identify confusions and ask questions.
3) Feel free to ask questions at any time and use my office hours. If you cannot make it during my office hours, please make an appointment and I will be happy to help.
4) If you have any sort of learning disability or are colorblind, please alert me during the first week of class, which will help me in coordinating with the Disability Support Services.
5) Quizzes will be administered throughout the course, so be well prepared at all class meetings.

EXPECTED LEARNING OUTCOMES

1. Foundation skills and knowledge: a) Students will be able to discuss microbial evolution and demonstrate understanding of interactions of microorganisms with their environment. B) Students will demonstrate understanding of traditional and emergent approaches to study environmental microorganisms. C) Describe the interactions of microorganisms with plants, animals and between microorganisms. D) Obtain understanding of measuring microbial biomass and metabolic activities related to microbial ecology and water quality. E) Develop a grant proposal on assigned topical areas in environmental microbiology.
2. Effective written and verbal communication: Students will develop an extensive written and oral vocabulary to communicate effectively with environmental science professionals, as well as the public at large.
3. **Critical thinking**: Students will demonstrate an ability to comprehend, dissect and critically evaluate the research literature in the broader context of the environmental microbiology

4. **Integration of learned skills and information:** Students will develop the ability to synthesize a holistic (interdisciplinary) approach to environmental problem-solving using cutting-edge genomic and biochemical approaches

Course Administration

Research Grant Proposal:	25%
Quizzes/Homework:	20%
Mid-term Exam:	20%
Journal Article Presentation	20%
Final Exam:	15%
Total:	100%

Final grades will be determined on the basis of the following scale:

A = 90% - 100%
B = 80% - 89%
C = 70% - 79%
D = 60% - 69%
F = 0% - 59%

Class Participation: Active participation in class discussions is strongly encouraged and highly valued.

Exams: The purpose of exams will be to evaluate students' critical thinking ability. The format for exams will be short answer and essay. The material for these exams will come from class discussions, lectures, textbook, reading handouts, and homework sets. Exam questions will also include concepts taken from the journal articles.

Discussions: On a rotating basis each student will lead a discussion on a selected peer-reviewed journal article that is pertinent to the topic being covered in class. You will select article(s) based on suggested topics and must be pre-approved by the instructor (this should be done as early as possible). Once approved, you should make copies of the article and distribute to fellow classmates and professor. This must be done at least a week prior to the discussion session. Failure to do so will result in a grade of '0' for the assignment. All students are expected to actively critique journal article being presented to include research background, objectives, methods, results and discussions and future directions. It is recommended that you read the selected article and prepare 2-4 specific questions and/or comments for the discussion. These discussion items are to be handed to the professor at the beginning of the lecture period. These written discussion questions will be included in the "class participation" grade.

Research Grant Proposal: As part of this class, you are expected to prepare and defend a research grant proposal. The proposal should be based on the question(s) you are trying to address during your MS/Ph.D. research project. **Topics must be approved by the instructor by 2/12/2013** and an outline of the proposal should be submitted to me right after spring break. In addition to the hard copy, you must also submit an electronic version of your proposal via email at ashvini.chauhan@famu.edu. Late submissions will not be accepted. Total length of the

proposal should not exceed 8 pages using single-spaced, 12-pt Times New Roman font, excluding illustrations and citations.

Each proposal should include the following:
A) Motivation for Research
B) Background
C) Hypotheses
D) Objectives
E) Analytical Methods
E) Expected Findings and Broader Impacts
F) Project Timelines
G) Budget Estimations

At the end of the semester, each of you will present your proposal to the mock panel consisting of Instructor(s) who will serve as program manager(s). Each of the enrolled students will serve as a panel reviewer and grade your proposal. **Your objective in this module is to present arguments as to why your proposal should be funded by the agency.** Make certain to include in your presentation, the scientific merit of your research question(s), methods used, proposed approach and expected scholarly contributions of your findings.

Make-up policy: Homework, presentations and projects will not be accepted late; no make-up exams will be given. This policy will be strictly enforced. Please refer to the University catalogue regarding class attendance regulations.

Attendance: Regular and punctual attendance is expected and is fundamental to success in this course. If a student is late for class they will be marked absent for that day. Information presented during class is the responsibility of the student whether he/she is present or not. It is up to the student to obtain class material and class assignments from other students when a session is missed. Note that any student exceeding 3 unexcused absences *'may be dropped from the course and assigned the letter F'* (FAMU's 2006-2008 Catalogue). For more information regarding class attendance regulations please refer to the University Catalogue.

Academic Honesty: Plagiarism and cheating will NOT be tolerated in any form. Plagiarism is defined as a direct and unattributed use of textual material. Evidence of plagiarism will result in reduction of grades by 50% for appropriate component of the course. Please review the Florida A & M University handbook *("The Fang*") for FAMU's academic honesty policy. The University's Academic Honor Policy is located in the FANG Student Handbook, under the Student Code of Conduct- Regulation 2.012 section, beginning on page 55-56.

Americans with Disabilities Act (ADA) Policy Statement: To comply with the provisions of the Americans with Disabilities Act (ADA), please alert instructor of accommodations required to insure participation in this course. Documentation of disability is required and should be submitted to the Learning Development and Evaluation Center (LDEC). For additional information please contact the LDEC at (850) 599-3180.

Non-discrimination Policy Statement: It is the policy of Florida Agricultural and Mechanical University to assure that each member of the University community be permitted to work or attend classes in an environment free from any form of discrimination including race, religion, color, age, disability, sex, marital status, national origin, veteran status and sexual harassment as prohibited by state and federal statutes. This shall include applicants for admission to the University and employment.

Cell Phone Policy: Cell phone use is strictly prohibited during class; no ringing, vibrating, text-messaging, games, pictures, etc. Failure to comply with this rule will result in your dismissal from the class.

Statement of Understanding

I, _____have read and completely understand the course policies for this class.

PRINT NAME _____

EVS 5027 Detailed course outline
Spring 2013

1/8: Overview of Syllabus, Course Organization and Administration, Expectations etc.

- Reference Reading: Introduction to Environmental Microbiology - Christon J. Hurst.

1/10: Introduction to Environmental Microbiology
1/15: Detection, Enumeration, and Identification of Environmental Microorganisms: Environmental Sample Collection & Processing; Microscopic Techniques; Culture Methods; Physiological Methods; Immunological Methods; Nucleic Acid-Based Methods of Analysis.
1/17: Continue detection
1/22: Microbial Environments: Soils and Subsurface Environments
1/24: Freshwater, Marine Environments and Extremophiles
1/29: Journal Article #1: (Student #1 leads discussions on any of the above topics covered in class)
1/31: Journal article #1: Contd.
2/5: Microbial Communication, Activities, and Interactions with Environment and Nutrient Cycling
2/7: Continue biogeochemical cycling
2/12: Biodegradation of Organic and Metal Pollutants
2/14: Continue biodegradation

Grant Proposal Title Due in Class

2/19: Journal Article #2: (Student #2 leads discussions)
2/21: Journal Article #2: Contd.
2/26: Environmental Degradation of Personal Care and Pharmaceutical Products (PCPPs)
2/28: Water- And Food-Borne Pathogens, Microbial Source Tracking

3/5: Journal Article #3: (Student #3 leads discussions)
3/7: Journal Article #3 Contd.
3/19: Waste Treatment/Water Quality, Bioenergy
3/21: Journal Article #4: (Student #1 leads discussions)
3/26: Journal Article #4: Contd.

Grant Proposal Hardcopy Due in Class

3/28: Journal Article #5: (Student #2 leads discussions)
4/2: Journal Article #5: Contd.
4/4: Journal Article #6: (Student #3 leads discussions)
4/9: Journal Article #6: Contd.
4/11: Defend Your Research Grant Proposal #1
4/16: Defend Your Research Grant Proposal #2
4/18: Defend Your Research Grant Proposal #3
4/23: Wrap up discussions on the future prospects of environmental microbiology
4/26: Continue wrap up discussions

April 29-May 3: Final exam week

*** Syllabus and instructor's schedules are subject to change at the discretion of the professor(s).**
