

CE 487– Microbiology for Environmental Science and Engineering, Spring 2008

Instructor: Assist. Professor Alison M. Cupples
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Office hours: 11:40 AM -12:40 PM, Tue/Thur, 3550 Engineering Building
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Description: This course discusses of the role of microbiology in environmental engineering. First, the fundamentals of microbiology are covered, followed by an application of these concepts to environmental processes such as wastewater treatment and bioremediation, as well as to human health.

Text: Madigan, Martinko and Parker. Brock Biology of Microorganisms, 11th Edition, McGraw Hill, 2006 (9th or 10th Edition can also be used, but readings may be slightly different).

Class Schedule: Tuesdays & Thursdays, 12:40-2:00 PM, 2205 Engineering Building
Other Dates: 2/1/2007- last day to drop with tuition refund
2/27/2007 - last day to drop with no grade reported

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|-----------------|----------------------------------------------------|-----|
| Grading: | 4 Quizzes (Jan 24, Feb 21, March 13, April 8) | 15% |
| | Exam I (February 7) | 15% |
| | Exam II (March 20) | 15% |
| | Final Comprehensive Exam (April 29, 12:45-2:45 PM) | 25% |
| | Paper (Due April 10) | 15% |
| | Presentation (April 17, 22, 24) | 15% |

Projected Grading

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|---------------|----------|-----|
| Scale: | 90-100 % | 4.0 |
| | 85-89 % | 3.5 |
| | 75-84 % | 3.0 |
| | 70-74 % | 2.5 |
| | 65-69 % | 2.0 |
| | 60-64 % | 1.5 |
| | 55-59 % | 1.0 |
| | 50-54 % | 0.5 |
| | <50 % | 0.0 |

Paper and Presentations

Paper is due April 10 on topic of choice related to those covered in class. It should be 7 pages (excluding references), double spaced text, 10-12 font size. Topics and a short abstract (200 words) should be submitted to me by February 28. You will base your presentation on the information collected for the paper.

Syllabus:

| DATE | Lec. # | TOPIC | READING |
|-----------------|--------|----------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 8 Jan. (Tue.) | 1 | Introduction & administrative details | 1.1-1.4, 2.1-2.6 |
| 10 Jan. (Thu.) | 2 | Macromolecules (review) | 3 |
| 15 Jan. (Tue.) | 3 | Cell structure and function (review) | 4.4- 4.16 |
| 17 Jan. (Thu.) | 4 | Stoichiometry and bacterial energetics I | Appendix 1, 5.6-5.7 |
| 22 Jan. (Tue.) | 5 | Stoichiometry and bacterial energetics II | Appendix 1, 5.6-5.7 |
| 24 Jan. (Thu.) | 6 | Quiz 1 : Lectures 1-5 Thermodynamics | Appendix 1 |
| 29 Jan. (Tue.) | 7 | Enzyme catalysis and kinetics | 5.4-5.5 |
| 31 Jan. (Thu.) | 8 | Microbial growth | 5.1-5.3, 6.1, 6.4, 6.6, 6.10, 6.13-6.15 |
| 5 Feb. (Tue.) | 9 | Energy generation, Exam I review | 5.8-5.14 |
| 7 Feb. (Thu.) | | Exam 1: Lectures 1-9 | |
| 12 Feb. (Tue.) | 10 | Molecular biology and genetics I | 7.1-7.6, 7.10-7.12 |
| 14 Feb. (Thu.) | 11 | Molecular biology and genetics II | 7.14-7.16, 10.1, 10.2, 10.7, 10.8, 10.11 |
| 19 Feb. (Tue.) | 12 | Microbial evolution | 11.1-11.4, 11.8 |
| 21 Feb. (Thu.) | 13 | Quiz 2 : Lectures 10-12 Photosynthesis | 17.1-17.5, 12.2, 12.32, 12.35, 12.20, 12.25, 12.26 |
| 26 Feb. (Tue.) | 14 | <i>Tentative Guest lecture: Selected Information Resources for CE 487, Tom Volkening</i> | |
| 28 Feb. (Thu.) | 15 | Chemolithotrophy, Paper abstract due | 17.8-17.12 |
| 4 Mar. (Tue.) | | <i>No class – Spring break</i> | |
| 6 Mar. (Thu.) | | <i>No class – Spring break</i> | |
| 11 Mar. (Tue.) | 16 | Anaerobic respiration | 17.13-17.18 |
| 13 Mar. (Thu.) | 17 | Quiz 3 : Lectures 13, 15, 16 The cycles | 19.9, 19.12, 19.13, 19.4, 19.16 |
| 18 Mar. (Tue.) | 18 | Water treatment & human health, Exam II review | 28.1-28.6 |
| 20 Mar. (Thu.) | | Exam 2: Lectures 10-13, 15-18 | |
| 25 Mar. (Tue.) | 19 | Epidemiology | 25.1-25.13 |
| 27 Mar. (Thu.) | 20 | Microbiological methods I, | 6.7, 6.8, 18.1-18.4, 20.1- 20.5 |
| 1 Apr. (Tue.) | 21 | Microbiological methods II | 7.7, 7.9, 18.5 |
| 3 Apr. (Thur.) | 22 | Microbiological methods III | |
| 8 Apr. (Tue.) | 23 | Quiz 4: Lectures 20-22 Metabolic regulation | 8.1, 8.2, 8.5, 8.6 |
| 10 Apr. (Thur.) | 24 | Viruses, Papers due | 9.1, 9.4, 9.5, 9.10, 9.14 |
| 15 Apr. (Tue.) | 25 | Bioremediation | - |
| 17 Apr. (Thur.) | 26 | Class presentations | - |
| 22 Apr. (Tue.) | 27 | Class presentations | - |
| 24 Apr. (Thur.) | 28 | Class presentations, Evaluations, Final exam review | - |
| 29 Apr. (Tue.) | | Final Exam: Comprehensive (12:45 – 2:45 PM) | |

Class Policies:

1. You are expected to come to class. Attendance will not be taken but excessive absence will be taken into consideration for the final grade.
2. The majority of the class follows the textbook, therefore it is to your advantage to read the assigned material.
3. You are responsible for everything in the lectures.
4. All exams are closed book. Make-up exams will only be considered in extreme cases and with prior notification from the instructor. Without notice, a doctor's note or other evidence of a valid last minute excuse is required.
5. It is expected that you will conduct yourself in a courteous, professional and ethical manner at all times. Cheating on exams will result in immediate dismissal from the course, receipt of a grade of 0.0 and referral of the case to the appropriate disciplinary authority.
6. The Department of Civil & Environmental Engineering adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades, and in the all-University Policy on Integrity of Scholarship and Grades, which are included in Spartan Life, Student Handbook and Resource Guide. Students who plagiarize will receive a 0.0 grade on the relevant assignment.