

Applied and Environmental Microbiology 2017F (Biol. 4711)

Lecture: 11:30am - 1:00pm, Monday and Wednesday.

Lecture Room: Room AT 2019

Office Hours: 1:30 - 2:30 pm, Monday (or by appointment).

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Outline of topics

1. Evolution of the biosphere
2. Physiological ecology: Microbial energetic and survival.
3. Quantification of environmental microbes (numbers, biomass and activity).
4. Molecular-based detection of microorganisms.
5. Microbial Diversity
6. Water treatments and bioremediation.
7. Microorganisms in aquatic and terrestrial environments.
8. Biogeochemical cycles.

Examinations

Mid-term exams: October 18 (Wednesday).

Due date of research paper: Nov. 22 (Wednesday).

Presentation dates: Dec. 4 (Monday).

Final exam: To be arranged.

Final date to register: September 18 (Monday).

Final date to withdraw: November 3 (Friday).

Mark distributions:

- 30% for the mid-term exam;
- 50% for the final exam;
- 15% for a 10-page term paper and presentation;
- 5% for assignments.

Books and References

Text book:

Environmental Microbiology: From genomes to biogeochemistry, 2nd Ed (2016). By Eugene L. Madsen. Blackwell Publishing.

References:

1. Environmental Microbiology, by R.M. Maier, I.L. Pepper and C.P. Gerba. Published by Academic Press.
2. Microbial Ecology, 4th edition, by R. Atlas and R. Bartha. Published by Benjamin/Cummings.
3. Brock Biology of Microorganisms, by M.T. Madigan and J.M. Martinko. Published by Pearson/Prentice Hall.
4. Selective articles from journals.

Environmental Microbiology (Biology 4711)

Project topics

1. Antibiotic contaminations in aquatic environments and its effect on promoting antibiotic resistant bacteria.
2. The effect of ROS on the survival of *E. coli* and other bacterial species in planktonic and biofilm state.
3. Bioremediation: Bacterial detoxification of Arsenic and Antimony.

Term paper

The 10-page term paper (double space, includes references) should include: **1)** a(n) Abstract/Summary; **2)** a Text broken into sections, including an Introduction and other specific sections; **3)** an Outlook (challenges and future directions); and **4)** a References section with at least 10 reference papers. Please use Applied and Environmental Microbiology (American Society for Microbiology Press) minireview paper format. A 1-page synopsis of the research topic should also be submitted at the same time with the term paper.

Styles of references

Journal articles

Cao JG, Meighen EA. 1989. Purification and structural identification of an autoinducer for the luminescence system of *Vibrio harveyi*. *J. Biol Chem* **264**:21670-21676.

Anetzberger C, Schell U, Jung K. 2012. Single cell analysis of *Vibrio harveyi* uncovers functional heterogeneity in response to quorum sensing signals. *BMC Microbiol* **12**:209. <http://dx.doi.org/10.1186/1471-2180-12-209>.

Book chapters

Newell RIE, Langdon CJ. 1996. Mechanisms and physiology of larval and adult feeding, p. 185-229. *In* Kennedy VS, Newell RIE, Eble AF (ed), *The Eastern oyster: Crassostrea virginica*, 2nd ed. University of Maryland Sea Grant Publications, College Park, MD.

Book

Dunne, WM. 1997. Blood cultures III, p. 1-10. American Society for Microbiology, Washington, D.C.

Website

Centers for Disease Control and Prevention. 2009. *Vibrio vulnificus*. <http://www.cdc.gov/vibrio/vibrio.html>.