

INSTRUCTOR: Robert Slocum  
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CLASS TIME: Fridays, 2:30 PM; HS G39

#### CELL PHONE POLICY:

If your cell phone rings in class, you will be asked to leave the classroom for the day. If it rings in class a second time, you will be asked to leave the class for the semester. Out of consideration for your classmates and the instructor, *please turn your phones off before coming to class.*

#### ACADEMIC HONOR CODE:

All students are bound by the standards of the Academic Honor Code, found at <http://www.goucher.edu/documents/General/AcademicHonorCode.pdf>

#### COURSE ORGANIZATION

This 1-credit course provides students with the opportunity to explore many contemporary topics in biology in greater depth than is possible in Bio 104. Students meet each week to discuss assigned readings or to make oral presentations on topics which they and their peers have researched. A field trip may also be scheduled during the semester.

For oral presentations, a group of 3 or 4 students will be assigned a topic to research. (Several topics related to subjects addressed in Bio 104 lectures will be suggested by the instructor.) One member of the team, chosen by the team itself, will serve as the "director" of the research, coordinating work carried out by each of the other team members. Each team member will contribute a specific part of the talk. Non-presenting students will question the presenters in class.

Each team will present talks on three separate dates during the semester. The team will write a paper on the same topic as the oral presentation once during the semester (due in class, any of the three dates).

## INTERNET RESOURCES

Students may elect to supplement traditional library searches with internet resources. If a significant part of the research is derived from a Web source, the student should cite the URL, and date that site was visited, in a bibliography (paper) or on PowerPoint slides in which the information is presented. Wikipedia citations, specifically, are not acceptable as stand-alone references, as this "open-source" material may be edited by anyone. Most of the resources used in preparation of talks or the paper should be published, peer-reviewed articles or books.

## PAPER

While a reasonable level of writing proficiency is expected, a thoughtful discussion of the work that was researched is preferable to a highly-"polished" paper that is simply a review of the literature. Students are encouraged to critically analyze the papers and topics that they read, emphasizing their own interpretations and possible significance of the work. The paper must contain a bibliography comprising a list of complete citations for all references cited in the text.

Papers are due at the beginning of class. Grades on papers turned in late will be penalized a letter grade per working day, unless an extension is granted by the instructor.

## ATTENDANCE

Students are expected to attend each class and to participate fully in group meetings and activities.

## COURSE GRADING

Grades for this course will be determined as follows:

Paper	20%
Oral presentations	60%
Class participation	20%

Date            Readings / Assignments

**Sept. 11**

Go over Syllabus.

Assigned readings on "Extremophiles":

- Kashefi K and Lovley D.R. (2003) Extending the upper temperature limit for life. *Science* 301: 934.
- Sharma A. et al. (2002) Microbial activity at gigapascal pressures. *Science* 295: 1514-1516.
- Edwards K.J. et al. (2000) An archaeal iron-oxidizing extreme acidophile important in acid mine drainage. *Science* 287: 1796-1799.
- Davies P. (2007) Are aliens among us? *Sci. Amer.* 297 (6): 62-68.

**Sept. 18**

Discuss extremophile readings.

Each team chooses from the following research topics (Group 1, first choice of topics, followed by Groups 2 and 3). Some possible topics:

- 1) Origin of life: Mechanisms of self-replication of RNA or other macromolecules; evolution of cellular "metabolism", "Panspermia", other topics.
- 2) Prokaryotes, Archaeobacteria: Any topic, *except* extremophiles.
- 3) The endosymbiosis theory for the origin of eukaryotic cells - the "inside" story.
- 4) Phylogenetic classification schemes, "Tree of Life" project, etc.

**Sept. 25**

Meet with Randy Smith, Research Services Librarian (Athenaeum, Library Classroom Rm 326):

Searching Wilson General Sciences Abstracts database; use and citation of Internet resources.

**Oct. 2**Oral presentations – **Round 1 (Groups 1 and 2)**

Assigned readings on antibiotic resistance, related topics.

- Loeffler J.M. et al. (2001) Rapid killing of *Streptococcus pneumoniae* with a bacteriophage cell wall hydrolase. *Science* 294: 2170-2172.
- Dantas G. et al. (2008) Bacteria subsisting on antibiotics. *Science* 320: 100-103.
- Taubes G. (2008) The bacteria fight back. *Science* 321: 356-361.

**Oct. 9 Oral presentations – Round 1 (Group 3)****Oct. 16**

Discuss antibiotic resistance readings.

Each team chooses from the following research topics (Group 2, first choice of topics, followed by Groups 3 and Group 1). Some possible topics:

- 1) Protists: The biology of malaria and the development of anti-malarial vaccines and therapies; "*Pfisteria hystera*" - recent developments.
- 2) Fungi: Mycorrhizal associations; insectivorous and nematode-catching fungi; biology and control of plant and human pathogenic fungi; role in nutrient cycling, etc.

**Oct. 23**Oral presentations – **Round 2 (Groups 2 and 3)**

Assigned readings on plant biotechnology/biofuels production.

- Gerngross T.U., Slater S.C. (2000) How green are green plastics? *Sci. Amer.* 283: 37-41.
- Grunwald M. (2008) The clean energy scam. *Time Magazine* 171:40-45. (April 7 issue)
- Raney T. and Pingali P. (2007) Sowing a gene revolution. *Sci. Amer.* 297 (3): 104-111.

**Oct. 30 Oral presentations – Round 2 (Group 1)**

**Nov. 6** Discuss plant biotechnology/biofuels readings.

Each team chooses from the following research topics (Group 3, first choice of topics, followed by Groups 1 and Group 2). Possible topics:

- 1) Plants: Production of pharmaceuticals in genetically-engineered plants; development of insect- or pathogen-resistant crop plants; use of plants in bioremediation of contaminated water and soils.
- 2) Sponge biology: sponge symbioses with zooxanthellae or any other topic.
- 3) Insects: biology of social insects: termites, ants, bees and wasps
- 4) Physiological adaptations of hydrothermal vent animals (e.g., adaptations for feeding, respiratory adaptations to hydrogen sulfide).
- 5) Schistosomiasis, or other parasitic worm diseases

**Nov. 13** Field trip to the National Aquarium in Baltimore

**Nov. 20**

Oral presentations - **Round 3 (Groups 1, 2 and 3)**

Assigned reading:

Watson, G. M. and Hessinger, D. A. (1989) Cnidocyte mechanoreceptors are tuned to the movements of swimming prey by chemoreceptors. *Science* 243: 589-1591.

**Nov. 27** No class scheduled (Thanksgiving recess)

**Dec. 4**

Discuss Watson and Hessinger (1989) reading.  
Course evaluations.

**Bio 104H Class Schedule (Abbreviated)**

Sept 4	No class scheduled
Sept 11	Course introduction, readings assigned
Sept 18	Extremophile readings – discuss in class
Sept 25	Randy Smith, Research Services Librarian (Athenaeum, Rm 326) ( <a href="#">Lecture Exam I</a> ); <a href="#">instructor in Arizona for meeting</a>
Oct 2	<b>TALKS 1 (Groups 1 and 2)</b> ; readings assigned
Oct 9	<b>TALKS 1 (Group 3)</b>
Oct 16	Antibiotic resistance readings – discuss in class ( <a href="#">Lecture Exam II</a> )
Oct 23	<b>TALKS 2 (Groups 2 and 3)</b> ; readings assigned
Oct 30	<b>TALKS 2 (Group 1)</b>
Nov 6	Plant biotechnology/biofuels readings – discuss in class
Nov. 13	<b>Field Trip to National Aquarium in Baltimore</b> ( <a href="#">Lecture Exam III</a> )
Nov. 20	<b>TALKS 3 (Groups 1, 2 and 3)</b> ; reading assigned
<b>Nov. 27</b>	<b>Thanksgiving – no class</b>
Dec 4	Watson & Hessinger (1989) reading; course evaluations