

Syllabus

Living in the Microbial World

11:680:101; 3 credits

Living in the Microbial World is a lecture course for undergraduates with little or no science background. There are no prerequisites for the course.

Course Summary

This course examines the impact of the microbial world on humankind. Students will be introduced to microorganisms from the beginning of life on a young and very different earth than we see today and follow the evolutionary journey that has shaped the modern world. The course is divided into three general areas of microbial impact:

1. The diversity of the microbial world.
2. The impact of microbes on human health.
3. The economic impact of microbial products and processes.

Students will assess news media coverage of current issues in microbiology and from insights gained in the course be able to evaluate future issues using a critical scientific approach. Through lecture, cases studies and panel discussion students will probe social issues and concerns relevant to the field of microbiology including disease, antibiotic resistance, the ubiquity of microbial products, the value of probiotics, and man-made microorganisms. The course considers humankind's exploitation of the microbial world including production of microbial food products, antibiotic/drug production, agriculture, bioremediation, and bioterrorism.

Textbook: There is no textbook for the course. Reading material, lecture guides and homework assignments will be posted on SAKAI. Students will purchase a book chosen for review from the course bibliography. An **IClicker** is needed.

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Office Hours: by appointment

Course Learning Outcome Goals

Students in this course will:

1. Understand the diversity of microbial communities and how they impact humans and the environment.
2. Develop scientific literacy and learn conversational microbiology so students may critically analyze and discuss current issues in microbiology knowledgeably.
3. Evaluate media coverage of events germane to microbiology using the scientific method and critical scientific analysis.



SAS Core Curriculum Learning Goals

- I: 21st Century Challenges
- c. Analyze the relationship that science and technology have to contemporary social issues.
- II: Areas of Inquiry
- A: Natural Sciences
- e. Understand and apply basic principles and concepts in the physical and biological sciences.
 - g. Identify and critically assess ethical and societal issues in science.

Grading Requirements:

The course grade will be based on three exam and three assignments as follows:

1. Portfolio of weekly newspaper periodical reports:		
	10@ 5 pts each	50 PTS
2. Book Review	1 @ 50 pts	50
3. Position paper	1 @ 50 pts	50
4. Exams	3 @ 50 pts	150
TOTAL		300 POINTS

Assignments

1. Portfolio of weekly newspaper periodical reports:

Each news media article critique included in the portfolio will follow the template questions provided*. Topics of articles critiqued must represent at least 5 of the 6 course topic areas. No more than three articles from a course topic area may be included. Four articles must be submitted to SAKAI before the midpoint of the semester.

2. Book review:

Students will choose from the bibliography provided**. Alternative titles will be considered for approval.

Your review should include the following:

SUMMARY: Discussion of major microbiological/scientific themes and ideas presented in the book.

AUTHOR: Provide a detailed discussion of the author's qualifications.

CRITIQUE: Thoughts responses and reaction to the novel including your reactions to the subject of the book, the author's position, how well it is written and overall success or failure of the book. Would you recommend the book? For which reader(s) is the book appropriate.

ORGANIZATION: Please be sure there to include a clear cut introduction, body, and conclusion in your review. There should be logical sequence order of topics covered and smooth transition between paragraphs.

SCIENTIFIC ACCURACY AND UNDERSTANDING: Your review should clearly indicate your complete understanding of the science covered and comment on the author's mastery of the subject matter presented.

3. Position paper:

The position paper will be a 3-4 page paper on one of the following topics. Consider the question/statement provided on each topic and take a position. Your position must be supported by appropriate and carefully sited references.

Dual use: Research altering the structure of infective viruses poses a threat to man and should be banned.

The Human Microbiome project: Is the high cost of the human microbiome project justified by the outcome?

Antibiotics and antimicrobial agents: An international agency must be established to reduce the worldwide overuse of these agents.

Student generated topics may be used with approval. The topics listed above will be supported with mandatory reading material & lecture and class room activities.

Course Content & Lecture Topics

Following an introduction to microbes, microbial life and the basics of how life works, the course is divided into 6 topic areas. Readings for each topic area are posted on SAKAI and labeled according to relevant topic. It is best to do the readings BEFORE the topic lecture!

Introduction: The Microbes: Cell, viruses and how they work.

1. Evolution & Microbial Diversity
2. Microbial Communities & The Human Microbiome
3. Microbes in the Environment
4. Disease & Prevention
5. Dual Use & Bioweapons
6. Microbial Products

Lecture Topics

1	Introduction to the Course – Assignments and Expectations Microbes and the Microbial World
2	Cells, Viruses & How They Work
3	The Microbial Genome & Bioinformatics
4	The Scientific Method (Grail Style) The Beginning of the Earth and Life: Evidence and Conclusions
5	Evolution and the Genealogy of Life on Earth
6	Microbial Diversity The Extremophiles; Life without Oxygen
7	Microbes in the Environment
8	Microbial Communities (Quorum Sensing TED TALK)
9	Soil Fertility and Composting; The Microbial Community in Your Mouth
	EXAM I
10	Microbes & Architecture (TED TALK) The Human Microbiome; Fecal Transplant
11	Disease, Infection & the Immune System
12	Practical Epidemiology
13	Transmission of Disease: Person to Person
14	Transmission of Disease: Soilborne and Insectborne Diseases
15	Foodborne Disease and Food Safety
16	Water Safety and Processing
17	Preventing & Treating Disease; Responsible Choices - VACCINATION
18	EXAM II
19	Preventing & Treating Disease; Responsible Use of Antimicrobial Agents
20	DUAL USE - Bioterrorism
21	Man's Dependence on Microbes; Overview of Microbial Products
22	Alcoholic Fermentation
23	Recombinant Products
24	Antibiotic Production
25	Biofuels
26	Food Additives & Probiotics
27	Blue jeans & Laundry Day
28	EXAM III

****Bibliography**

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