

Living with Microbes MCB-3007

Instructor	Dr. Miroslav Gantar
Phone	305-348-4030
Office	OE208
e-mail	gantarm@fiu.edu
Time and Place	Tu/Th 12:30-1:45 pm, GL100

The Scope

In this course, students will gain a sense of the essential role of microorganisms in our health and the health of our environment, as well as develop the ability to discern which sources of information are credible. Given the fact that human health and environment are interconnected on a global scale and of paramount significance, this course fits perfectly into the concept of Global Learning teaching at FIU. There will be no textbook, instead reading material required for this course will be obtained primarily from the Internet. This will be facilitated by use of FIU LibGuide. This is a course for non-biology majors.

Description

The main objective of the course is to generate awareness of the crucial role microbes play in (1) human health, (2) sustaining the environment, and (3) maintaining this interdependent relationship in a way that continues to support life as we know it. Through readings and class presentations students will be able to learn about the necessity of our internal and external microbial communities working in synchrony with our bodies and our environment. Based on information obtained primarily from the Internet, students will be able to express their own opinions but also take evidence-based positions on issues such as global warming, controversial medical treatments, alternative medicine, use of genetically modified food, etc. The course will examine different aspects of environment endangerment caused by human activities as well as the effect of the changed environment on the human organism and health in general. This is envisioned as a course that will be based on three principles: (1) active learning, (2) real life situations, and (3) global learning.

Learning Outcomes/General Objectives of the course

After completing this course, students will be able to:

1. Understand that microbes play a significant role in protecting and balancing both environment and human health
2. Critically evaluate and discern between reliable and questionable media sources
3. Identify inconsistencies between media coverage and original research findings

Global Learning Outcomes

Global Awareness - Students will be able to show awareness of the global interrelationship between human affairs and disease causing microorganisms, their use in biotechnology, and their role in environment sustainability.

Global Perspective - Students will be able to discern the ways in which microorganisms can be perceived as either beneficial or detrimental from multiple points of view, e.g. industrial, agricultural, social, economic, and environmental.

Global Engagement - Students will be able to analyze a problem regarding a microbiological situation and present a plan for potential abatement of a crisis situation caused by a microbiological issue.

Teaching methodology

The course will utilize active learning and collaborative learning techniques that will stimulate critical thinking. Assignments will include (1) oral presentations (2) writing a paper on selected topics, and (3) taking part in class discussions. Guest speakers will be scheduled for some classes. Students will be required to come to class prepared by reading information on a specific topic. It is expected that this will result in opposing opinions. Instructor's lecturing will be kept at minimum and will be given at the beginning of the class as an introduction to a topic. Each class will be organized around students' presentations.

Students signing up for the presentation will be asked to propose a specific title or problem statement to cover the topic outlined in the Class schedule (subject to approval by the instructor).

After a student presentation, class discussion and answering multiple choice questions using the i-clicker, the class will come to a conclusion determining the correct answer.

Alternatively, to proposing their own title for presentation, students can select a title offered by the instructor which will require problem solving. An example: "A nine year old boy developed a severe skin allergy. In a four-member family he is the only one showing symptoms. The symptoms are particularly severe in the morning. An environmental inspector tested the air in their home for a potential chemical pollutants and found none. What else could have caused the symptoms?" The presenter is expected to list and explain all other potential causes of allergy.

Assignments

Mandatory assignments

- (i) Students will be required to come prepared to class by reading the article(s) or text that will be listed for each class on the course website.
- (ii) Students will be required to either
 - 1- Do an oral presentation on a topic offered by instructor (see oral presentations) or
 - 2- Write a paper on the topic of their choosing, subject to approval by the instructor. Each approved topic will have a global perspective.Those students who opt for the presentation, will **not** have to submit a paper.

Assignments for extra credits

- (i) Presentations may be more stressful to some students. In order to encourage presentations (skills learned are extremely valuable), those who opt to present will receive between 1-5 extra points. The presentation can be either an individual or a team assignment (up to three students). In order for the whole class to benefit from a presentation, the presenters will be required to prepare the presentation by working closely with the instructor.

- (ii) Participating in “[Tuesday Times Roundtable](#)”. This is FIU’s weekly series of moderated conversations on The New York Times articles from the multiple viewpoints. Participating in this program, students will earn 1% points for participation in each session.

How to prepare a Power Point presentation

If you decide to do a Power Point presentation, please select a title from the list of presentations provided. To reserve a spot please send an e-mail to your professor. The presentation should cover:

- The microbiology problem
- The global aspect of the problem
- Three multiple choice questions (to be included in the exam)
- Include one Youtube video (not longer than 5 min) regarding the presented topic

The presentation slots are assigned to students on first come first served bases. The presentation should have 15-20 slides (15 min). You are expected to send your PP presentation to your professor one week ahead of time, so that all necessary corrections can be done in timely manner.

How to write an essay

You can chose to write a paper (3-5 pages, double space, font 12) on a microbiology topic of your choice. It has to cover microbiological aspect as well as an aspect of the global perspective.

Examples of essay titles:

- Tuberculosis – a social aspect of a disease
- Is globalization preventing or contributing to spread of AIDS
- Microbial water contamination in beaches of South Florida
- HIV in Miami-Dade County

The essay should provide basic information on the medical and microbiological aspects of the disease (causative agent, symptoms, treatment, etc.) as well as the social aspect (e.g. socio-economic characteristics of those suffering from this disease, geographic distribution; historic perspective, etc). A paper should present the perspective/position of different nations/countries in regard to measures for preventing disease outbreaks (e.g. type of health care system, vaccination programs etc.) and compare those to WHO standards.

Please request an approval of the title of your paper by sending an e-mail to your professor gantarm@fiu.edu and submit the paper as a Word document to the same e-mail address.

Exams

There will be three exams over the course of the semester. The final exam will not be cumulative. Each exam will consist of 50 multiple choice questions. The questions will be based on (1) the information provided in students’ presentations and (2) text published on the internet, the links to which will be provided on the course website as “recommended reading”. You will be required to bring #2 pencils with at least one eraser. Laptops, palm pilots, cell phones or other electronic devices ARE NOT ALLOWED during the EXAM. You will be required to bring your FIU student ID to every exam. Wearing brimmed hats or baseball caps during exams is not permitted.

Make-up Exam

If you are unable to attend an exam, contact the instructor at least 48 hours prior to the scheduled exam time to discuss alternatives. Missed exams may result in a score of zero if the instructor is not notified in a timely fashion. Make-Up exams will be given only to students providing valid documentation of a medical or other serious problem.

Attendance

Given the seminar style nature of this course it is essential for students to be present in class. Student presentations and in-class interactions are meant to enhance learning and improve ability to discern accurate from inaccurate or incomplete information. Attendance record will be based on i-clicker participation, therefore the use of i-clicker is mandatory. You can either buy or rent the i-clicker from the FIU Bookstore. After obtaining the i-clicker you will need to register your device <http://www1.iclicker.com/register-clicker/> by using your Panther ID #. You will be allowed to have three absences during the semester without being penalized and losing 10% of your grade.

Grading policy

The final letter grade will be based on:

- The average score of three exams (worth 60% of the grade)
- Presentation or the paper (worth 30% of the grade)
- Attendance points (10%)
- Extra credit points earned for presentation (1-5% points).

Readings

All information needed for the course will be obtainable from the Internet. Website links will be provided for every topic on the course website.

Course prerequisite

None

Academic conduct

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

Cheating

Cheating will not be tolerated! Students caught cheating during an examination will be removed from the exam and given an "F" for the course. **Plagiarism** is academic misconduct that involves using words, opinions, and information of others as your own. Written work will be analyzed in "turnitin.com" and any document identified as plagiarism will generate an "F" and charges for

“Academic Misconduct” against the student will be brought up. Academic Misconduct becomes a permanent part of a student record.

Incomplete Grades

An incomplete grade is a temporary symbol given at the discretion of the instructor for work not completed, because of serious interruption not caused by the student's own negligence. An incomplete grade must be made up as quickly as possible, but no later than two semesters or it will automatically default to the grade that the student earned in the course. There is no extension to the two semester deadline. The student must not register again for the course to make up the incomplete. Incomplete grade will require written documentation (doctor's note, accident report, etc.) of the underlying condition that impedes student progress. A form will need to be signed by the student detailing the procedure and agenda for completing course-work. Students who receive an incomplete grade and have applied for graduation at the end of that term, must complete the incomplete grade by the end of the fourth week of the following term. Failure to do so will result in a cancellation of graduation. That student will need to reapply for graduation.

Topics to be covered

- (1) General information about microbes (weeks 1-4)
- (2) Environment-Microbe-Human interactions (weeks 5-10)
- (3) Human microbiome (weeks 11-14)

Course Calendar

Date	Topic	Presentation
Jan. 9	Introduction – About the course	
11	About the microbes – what are they?	1. Types of microbes 2. Microbes - what they do? 3. Bacteria – how they look?
16	About the microbes – what are they?	1. Viruses 2. Fungi 3. Observing Bacteria – A historic perspective
18	How microbes affect humans?	1. Pathogenic microbes – how are they hurting us? 2. Probiotics – do we need them? 3. Photosynthetic microbes – how important are they?
23	How microbes affect humans?	1. Can cellulose degrading microbes solve the fuel crisis? 2. Great famine in Ireland 3. Flu epidemics in 1918
25	Where do we find them?	1. Soil microbes – what is their role? 2. Microbes in aquatic environments 3. Microbes in the air – are they dangerous?
30	Where do we find them?	1. Microbes and Art - Degradation of Paintings 2. Microbes and symbiosis 3. Unusual bacteria – where do we find them?
Feb. 1	Dealing with microbes	1. Why to ferment food? (Examples from different countries) 2. Microbes and bioterrorism

		3. Microbes pathogenic to plants
6	Dealing with microbes	1. What is causing food poisoning? 2. Why people get sick on cruise ships? 3. Is mold in your home making you sick?
8	Exam 1	
13	Non-pathogenic microbes and human body	1. Is it wrong to not want 10 trillion bacterial cells to live in my body? 2. Circumcision – good or bad? 3. What is causing allergy in an indoor environment?
15	Human activities affecting the environment	1. Cholera and climate change 2. Use of antibacterial soaps – do they really work? 3. Genetic engineering – how does it work?
20	Human activities affecting the environment	1. Genetically modified crops – good or bad? 2. How do oil spills affect coral reefs? 3. Chemical fertilizers cause toxic algal blooms
22	Using microbes to get a product	1. How to make wine? 2. How to make cheese? 3. How antibiotics are produced?
27	Using microbes to get a product	1. Using microbes to get food colorants 2. Using algae as food and feed 3. Methane producing bacteria
Mar 1	Microbes affecting the environment	1. Toxic slime: why are some algae in Florida dangerous? 2. Symbiotic microbes and crop production 3. Wood degrading microbes and human affairs
6	Microbes affecting the environment	1. Why are the corals dying around the world? 2. Plant diseases – what is causing them? 3. What is killing bees and what does it mean for us?
8	Using microbes to protect the Environment	1. Nitrogen-fixing algae as bio-fertilizer – experience from Asia 2. Oil degrading bacteria 3. Waste water purification
20	Exam 2	
22	Immunity vs microbial infection Submit a paper	1. Controversies with vaccines- anti vaccine movement in the USA 2. History of vaccine development 3. AIDS - a worldwide epidemic
27	Microbes affecting eyes	1. River blindness – what is causing it? 2. Trachoma the leading cause of blindness in the third world countries 3. Conjunctivitis (pinkeye), what is causing it?
Apr 3	Microbes affecting skin	1. Acne – the most common skin disease 2. Skin warts 3. Fungal skin infections
5	Diseases of the Nervous System	1. Rabies – the disease of animals and humans 2. Botulism – why newborns should not eat honey? 3. Why is meningitis common in college students?
10		1. Bubonic plague throughout history

	Diseases of the Cardiovascular System	2. Lyme disease in the United States 3. Ebola – where does it come from?
12	Diseases of the Respiratory System	1. Tuberculosis - how was it treated before antibiotics 2. Diphtheria used to be deadly childhood disease 3. How common it is the common cold?
17	Diseases of the Gastrointestinal System	1. Cholera in post-earthquake Haiti 2. Food poisoning - how to prevent it? 3. Peptic ulcer – what is causing it?
19	Diseases of the Genitourinary System	1. Syphilis in Miami-Dade county 2. Gonorrhoea – can you develop an immunity? 3. Genital herpes – can it be cured?
May 1	Final Exam	