

Introductory Microbiology MCB2000

Fall 2016

Instructor: Dr. Miroslav Gantar

Office: OE 208 (MM Campus)

Office hours: Tuesday/Thursday 11:00 -12:00 and 2:00 – 5:00 pm

Or any other time by appointment

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Course Description

MCB 2000 is a 3-credit course intended to introduce non-science major students to the principles of Biology using microorganisms. The course is also a requirement for students in Dietetics, Nutrition and Nursing. The role played by microbes in the earth, aquatic environments, air, Biotechnology as well as in humans and other organisms, has a major impact on human affairs. The course covers basic concepts of microbes as pathogens, food spoilage and fermentative organisms. Microbial relationships to immunology, sanitation, pollution and geochemical cycling will also be covered.

This is a Global Learning Course - therefore it will enhance students' Global Awareness, Perspective, and Engagement, so that all students in this course will have knowledge that scientific discoveries arise globally, affect human affairs globally and should be shared globally. This will be achieved through (1) accentuating the multi-dimensional value of significant discoveries in Microbiology, and (2) evaluating the significance of microbiological issues to human affairs historically and geographically. For example, the students will be asked to evaluate what was the socio-economic characteristic of the societies in which the discoveries happened; if there are any comparable discoveries in other geographic regions and to identify those; what were the contemporary significant achievements in art, literature, film-making etc.

As a Global Learning Course, in addition to textbook-based information, this course will enrich the learning process with information regarding the impact of Microbiology on social issues globally. This interdisciplinary global aspect of the course will be covered through (1) lectures, (2) lectures provided by guest speakers, and (3) students' assignments. FIU teachers from different Departments such as Sociology, History, Art and other non-FIU specialist will be invited to give talks as part of regular lectures. The purpose of these invited lectures will be to connect social or cultural events with microbiological crisis events or significant discoveries (e.g. what historical event preceded to the big flu epidemic in 1918).

Course Objectives

The objective of the course is to teach students to:

- Apply scientific principles and theories to problem solving

- Scientifically evaluate situations in which microorganisms play role (relationship between microorganisms and diseases, food spoilage, production of drugs etc.)
- Distinguish between “good and bad microbes”
- Understand the basic microbiological techniques (concept of aseptic work, cultivation and identification of microorganism)
- Use scientific theories to test microbiological hypothesis
- Assess and critically evaluate claims made in popular media for their scientific merit.

Global Learning Course - Specific Objectives

Global Awareness - Students will be able to show awareness of the global interrelationship between human affairs on one side and disease causing microorganisms, Biotechnology, and Environment issues on the other side. More specifically it will include:

- Understanding of the scientific concepts that underlies the global nature of diseases caused by microorganisms
- Developing critical thinking based on new global scientific information obtained in class
- Understanding the impact of discoveries in Microbiology on global human affairs (novel cures, bioterrorism...)
- Understanding the interrelationship between microbiological diseases and social/economic factors
- Navigating through time - connecting/associating discoveries in Microbiology with the achievements in Arts and Humanities

The assessment for Global Awareness will be in the form of (1) embedded test questions and (2) assignments.

Global Perspective - Students will be able to analyze health and economic issues related to microbiological situations that occur globally. The global industrial and agricultural use of microbes and their effect on social interaction will be analyzed with respect to global economies and pollution. This will include:

- Comprehension of why microorganisms have a global impact on human affairs
- Analyze why socio-economic factors may be responsible for outbreaks of diseases (Example: Outbreak of Cholera in post disaster Haiti)

The assessment for Global Perspective will be in the form of (1) embedded test questions and (2) assignments.

Global Engagement - Students will demonstrate a willingness to engage in disease prevention/intervention to address individual or global health problems, and other microbiological situations. This will include the development of the following abilities:

- To analyze students’ own willingness to be involved in problem remediation regarding microbiological situations
- To present their own plan for potential abatement of crisis situations caused by microbiological issues

The assessment for Global Engagement will be accomplished by grading the papers to be submitted by students.

Interdisciplinary content - Invited lectures

Interdisciplinary content of the course will be covered through invited lectures to be provided by FIU faculty from different Departments as well as by other specialist (e.g. representatives from County Health Department, Health care institutions, etc.). These lectures will be embedded in regular lectures for the purpose of interconnecting microbiology-caused events and some social or cultural developments. One example:

Chiropractic practice – can it improve the function of the immune system?

These lectures will be organized on contingency bases and will depend on the availability of the speakers and they might vary between semesters.

Common reading for Global Learning:

Appiah, K.A., “The Case for Contamination,” New York Times, January 1, 2006. Online at http://www.nytimes.com/2006/01/01/magazine/01cosmopolitan.html?_r=1&pagewanted=print

Why this course belongs to Global Learning Initiative

Microbes are global. No other organisms affect human lives as microbes do. They can be found in any environment. Their global significance can be found in the facts that they sustain life on planet Earth through the recycling of elements, by providing food (through fermentation), by maintaining health (probiotic activity), and by causing diseases (pathogenic microorganisms). They are not restricted by time or social/political system. In others words, microbes are truly global.

Prerequisites

None

Required Text

Cowan, 2012 (3rd edition), MICROBIOLOGY - A Systems Approach, McGraw Hill Higher Education or

Cowan and Talaro, 2009 (2nd edition), MICROBIOLOGY - A Systems Approach, McGraw Hill Higher Education

The text can be purchased:

- at the FIU bookstore
- as an E-BOOK for a much lower price from the publisher <http://www.coursesmart.com/>
- from abebooks.com for discounted versions of new and used books,
- from amazon.co.uk and others or international editions. The international editions are paperback and about half the cost, give them a week to send from the UK.

i-clicker

You will be required to have an i-clicker. You can either buy it or rent it 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 #.

Assignments:

The active learning strategy includes the following components:

- Required:
 - Writing an essay
 - Global Learning Questions
- Optional: A Power Point presentation – extra credit (see below)

Writing an essay. You can choose 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
- Dengue Fever: how does it affect underdeveloped countries?

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 Dr. Prabhakar Pant (TA) ppant002@fiu.edu and submit the paper as a Word document to the same e-mail address.

Global Learning Questions - Will be provided during each class. You will have to look for the correct answer (not to be found in the text book). The same questions will appear on the exam. Each exam will contain 10% of Global Learning questions.

Power Point presentation. The topic of the presentation should have a global perspective and it should cover new or controversial information of a microbiology problem. If you decide to give a PP presentation, then you **will not** have to write an essay. In addition, you will earn between 1-5% points as extra credit. For an example of the topic, please see above (same as writing an essay). If there are more registered students for presentation than available spots, then your teacher will select presentations that are the most relevant for this Global Learning course. Students' presentation will be given during the regular classes. (see the course calendar).

To get an approval for the title of oral presentation please send an e-mail to gantarm@fiu.edu. Once the title is approved, you can start working on your presentation. You are expected to send your PP to your teacher one week ahead of time, so that all necessary corrections can be done in timely manner.

Before you start writing an essay or preparing an oral presentation

The topic and the title of the essay/field work/oral presentation need to be approved beforehand by your teacher (check the due date in the Course Calendar).

For the title approval for the paper send an e-mail to Dr. Prabhakar Pant (TA) ppant002@fiu.edu

For the title approval for oral presentation send an e-mail to gantarm@fiu.edu

The essay and presentations will be graded based on a rubric that will evaluate: Scientific and Global aspect of the selected topic.

Attendance

No attendance will be taken. However, participation (i-clicker) will be rewarded. You can earn three extra points if you have less than 3 absences.

Grading

Your final letter grade will be based on:

- (1) The average score of three exams (worth 70% of your grade) and on
- (2) The score obtained for the paper on Global-Interdisciplinary aspect of the course (worth 30% of your grade). In addition, you can choose to accomplish additional assignment for extra credit (see below).
- (3) Extra credits earned – see below

The letter grade will be given after the 3rd exam and will be based on a class curve. If a regular grade distribution occurs, the standard grading scale (90%-100% = A, 80%-89% = B, 70%-79% = C, 60%-69% = D, <60% = F) will be used. If the average score of the whole class is below 75%, then the curving will be applied.

Exams

There will be 3 exams over the course of the semester - each consisting of 50 multiple choice questions and each worth 100% course points. Each exam will have 10% questions covering the global aspect of the course. Exam #3, though scheduled during the week of finals, will not be cumulative.

Exams will be multiple-choice with sense-mark (Scantron) answer sheets.

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.

Extra points can be earned by:

- (1) Participating in sessions with the PLTL program (Peer Led Team Learning). By actively participating in PLTL you will gain extra points that will increase your final grade by up to 5% points. Please reference the PLTL Syllabus (<http://pltl.fiu.edu/>). Why should you use their services? Each week you will be meeting with a PLTL leader and a small group of students. A PLTL Leader is a peer who has taken the course before and will guide you through the worksheets each week. This will definitely help you score higher on the exams. Learn how to get those extra points by contacting the PLTL team.
- (2) Giving a 10-minute Power Point presentation. Please see above.

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. Alternatives to a score of zero for the exam may be discussed with the instructor.

Make-Up Exams will be given only to students providing valid documentation of a medical or other serious problem. Make-Up exams are **not** based on multiple choice questions; they will be in the form of essay questions.

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.

Pre-Nursing Students

Note of Advice

MCB2000 and Lab are required along with other science courses for entry into BSN in the School of Nursing. This course will cover the basics of biological sciences as well as the basic nature of microbial diseases, immunology and epidemiology. This course is not simply a requirement, but rather one that can provide the fundamental scientific background to Nursing.

Please note that the admission requirements to FIU's Nursing program do not allow repeats in science courses. That means you must earn at a minimum a grade of C (not C- or lower). Nursing program is very competitive and a grade of C does not guarantee that you will get in.

Course Calendar

| Date | Chapters | Ch. # | Activity |
|---------|---|-------|--|
| Jan. 10 | Introduction | 1 | |
| 12 | History of Microbiology | 1 | |
| 17 | Chemistry of Microbiology | 2 | |
| 19 | Tools in Microbiology | 3 | |
| 24 | Cell structure - Prokaryotic cell | 4 | Start submitting a topic for a paper/presentation for approval |
| 26 | Cell structure - Eukaryotic cell | 5 | Guest speaker: TBA |
| 31 | Viruses | 6 | Student presentation (1) |
| Feb. 2 | Microbial Nutrition and Growth | 7 | Student presentation (1) |
| 7 | Microbial Metabolism | 8 | Student presentation (1) |
| 9 | EXAM I | | |
| 14 | Microbial Genetics | 9 | |
| 16 | Genetic Engineering | 10 | Student presentation (1) |
| 21 | Control of Microbes | 11 | Student presentation (1) |
| 23 | Drugs and Microbes | 12 | Student presentation (1) |
| 28 | Microbe-Human Interactions | 13 | Guest speaker - TBA |
| Mar. 2 | Non-Specific Defense | 14 | Student presentation (1) |
| 7 | Specific Immunity | 15 | Student presentation (1) Submit a paper |
| 9 | Disorders in Immunity | 16 | Student presentation (1) |
| 13/18 | Spring Break | | |
| 21 | Diagnosing Infections | 17 | Student presentation (1) |
| 23 | EXAM II | | |
| 28 | Diseases of Skin and Eyes | 18 | Student presentation (3) |
| 30 | Diseases of the Nervous System | 19 | Student presentation (3) |
| April 4 | Diseases of the Cardiovascular and Lymphatic System | 20 | Student presentation (3) |
| 6 | Diseases of the Respiratory System | 21 | Student presentation (3) |
| 11 | Diseases of the Gastrointestinal System | 22 | Student presentation (3) |
| 13 | Diseases of the Genitourinary System | 23 | Student presentation (3) |

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|----|----------------------------|-------|--------------------------|
| 18 | Environmental Microbiology | 24+25 | Student presentation (4) |
| 25 | FINAL EXAM | | |