

Syllabus SUMMER 2010

Course Number and Name: MB 2323 General Microbiology Lecture

Course Hours: 2 lecture hours, 3 lab hours

Course Credits: 3.5

Contact Information:

Course Professor: Martha J. Friesen, PhD Microbiology and Immunology

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Required Readings/Texts: Lecture Note Pack, available through Scholar 360

Suggested Readings: Medical Microbiology, by Jawetz, Melnick, and Adelberg
24th edition, Lange Medical Books/McGraw Hill, 2007

Any general microbiology text

Scholar 360 Address: <http://scholar360.com/txchiro>

NOTE: this trimester, all assignments, notes, or announcements will be placed on Scholar 360. There may be additional figures and diagrams available in the Library at the Circulation desk. The student is responsible for downloading and photo copying any of the materials.

Course Description:

This course introduces important concepts of microbiology, including classification, structure, and growth of microorganisms. Microbial genetics covers the mechanisms of replication, transcription and translation, as well as the primary methods of genetic recombination. The course surveys the major types of medically important microorganisms including bacteria, viruses, fungi, protozoans, algae, and the parasitic worms. Various physical, chemical, and chemotherapeutic methods of control of microbial growth are discussed. The laboratory portion of the course is designed to acquaint the student with the basic medical microbial laboratory techniques.

PREREQUISITE: Human Biochemistry

CCE / TCC Competencies:

1. CCE: “Diagnostic Studies” competency
2. CCE: “Diagnosis” competency

Learning Outcomes (Lecture): the student should be able to.....

1. be introduced to the fundamental concepts of general microbiology
2. understand the overall structure of microbial cells, and to understand their growth requirements and characteristics.
3. be introduced to the mechanisms of genetic transfer in bacteria, and to show the importance of microbial recombination.
4. appreciate the major groups of medically important microbes affecting man.
5. be introduced to the various chemical and physical microbial control methods.

Learning Objectives (Lecture): the student should be able to.....

1. define key terms related to general microbiology
2. describe the differences in prokaryotic versus eukaryotic cells.
3. describe and list the major bacterial cell structures.
4. describe and diagram the structure and function of DNA.
5. describe and list the major methods of genetic transfer, including transformation, transduction, and conjugation.
6. be able to list and describe the major groups of pathogenic bacteria.
7. describe the general characteristics of viruses.
8. differentiate viruses based on genetic material.
6. describe the general characteristics of fungi.
7. list and describe some of the important fungal pathogens.
8. describe the general characteristics of protozoans.
9. list and describe some of the major protozoan pathogens.

10. describe the general characteristics of the parasitic worms.

11. list and describe some of the major parasitic worms affecting man.

Teaching Philosophy:

My approach to teaching this basic course is to assume the student has not been introduced to many of the concepts covered in general microbiology. Thus the course is taught from ground zero, on an introductory level, in an organized step by step method. It is expected, however, that the student can recall basic biochemical principles. Immunology is the co-requisite course, but not a requirement.

To best benefit from this course, the student should come to class on time, having looked over the material to be discussed. Note packs are available on Scholar 360, and it is assumed the student has one. It is expected that the student will ask questions on topics not completely understood.

My teaching methods are simple. I use the overhead projector to show the outlines presented in the note packs. I fill in the blanks during lecture, and try to repeat things from previous lectures. The student should notice the built in review aspect of the course, and use that as “free” study time.

As course instructor, I come to class prepared to address certain topics. I expect the student to come to class and pay attention. As there is a lot of review in each lecture, those students who have previewed the material will benefit the most.

Student Responsibilities:

Participation: I expect the student to ask questions when they do not understand. I do “throw out” questions during class, but do not require students to stand up and answer. Their part in the participation is to come to class and pay attention. Working on other material or reading other class material is considered disrespectful. Students will be asked to put the other material away during class.

Daily Responsibilities: I expect the student to act as a professional: come to class ready to learn, pay attention, review the material, make the most of the time in class, and to ask questions.

Quizzes/Exams: there are no formal quizzes. There will 3 midterm exams, a final exam (comprehensive), and two lab exams.

Course Content and Outline:

Major Topics: the following represents the tentative lecture sequence. The note pack sequence follows the lecture sequence.

DISCLAIMER: Below is a tentative lecture schedule. I typically do not follow a regimented strict schedule. I prefer a more flexible approach to the topics at hand. Some topics – depending on the class -- take longer to cover. Some take a shorter amount of time. While the weekly designation may change, the sequence of topics will not. The amount of material on each exam will not change. Exam dates are tentative, and will be finalized only after the material on that exam has been covered. Also taken into consideration will be scheduled exams in other courses so as not to overload the student.

- WEEK 1 : Orientation
 Handing out of syllabus
 Discussion of syllabus
- WEEK 2: Basic concepts of General Microbiology
 Diversity of microbes
 Prokaryotic versus Eukaryotic
 Multicellular versus unicellular
 Autotrophic versus heterotrophic
 Role of microscopy
 Cell theory
 Germ theory of disease
 Koch's postulates
 Size considerations
- WEEK 3: Basic concepts continued
 Taxonomy
 Binomial nomenclature
 Whittaker classification scheme
 Importance of microbes
 Important researchers
- Brief survey of microbes
 Bacteria
 Viruses
 Fungi
 Algae
 Protozoans
 Parasitic worms
- Bacterial cell structure
 Review of eukaryotic cell structure

Prokaryotic cell structures
Basic shapes of bacteria

WEEK 4: Bacterial cell structure continued
Plasma membrane
Cytoplasm
Inclusion bodies
Ribosomes
Chromosome
Plasmids
Cell wall
Differential stains (Gram stain, Acid fast stain)
Capsules
Flagella
Pili
Spores

Bacterial growth and nutrition
Asexual binary fission
Growth curves

WEEK 5: EXAM 1 (Introduction through Spores)

Bacterial growth and nutrition continued
Factors affecting growth
Temperature
Oxygen and Carbon dioxide
pH
How to cultivate bacteria in the lab
Types of media (solid, liquid, gel)
Role of agar
Types of media
General
Enriched
Differential
Selective

WEEK 6: Major bacterial groups
Gram positive cocci
Gram negative cocci
Gram positive bacilli
Gram negative bacilli (oxidase negative)
Gram negative bacilli (oxidase positive)
Gram negative curved bacilli
Acid fast positive bacilli
Spiral shaped bacteria

Cell wall deficient bacteria
Obligate intracellular parasites

Control of Microbes

General considerations

Basic mechanisms of action

Selected methods of control

Autoclaving

Boiling

Incineration

Baking

Handwashing

Filtration

Radiation

Chemicals

Antibiotics

Sulfa drugs

Quinalones

Penicillin/Cephalosporin

Chloramphenicol/Erythromycin

Tetracycline/Aminoglycosides

Polymyxins

Resistance to antibiotics

- WEEK 7: Bacterial genetics
Recombination mechanisms
Transformation
Conjugation
Transduction
- WEEK 8: Exam 2 (Bacterial Nutrition through Recombination)
- WEEK 9: Introduction to the Fungi
General characteristics
Economic importance
Basic structure
Laboratory identification
Classification of fungi by sexual spores
Zygosporos
Ascospores
Basidiospores
Deuterospores
Common mycoses
Superficial
Cutaneous

Subcutaneous
 Systemic
 Opportunistic
 Intoxications

WEEK 10: Introduction to the Parasitic Protozoans

General characteristics

Classification based on motility

Pseudopods

Flagella/undulating membranes

Cilia

No visible means

Transmission

Identification

Important pathogens

Entamoeba histolytica

Naegleria

Giardia lamblia

Trichomonas vaginalis

Leishmania species

Trypanosoma species

Balantidium coli

Toxoplasma species

Plasmodium species

Cryptosporidium species

WEEK 11: Introduction to the Parasitic Worms

General characteristics

General classification

Phylum Nematoda

Ascaris species

Hookworms

Trichinella species

Enterobius species

Trichuris species

Filarial worms (Dirofilaria species, Wuchereria species)

Phylum Platyhelminthes

Class Trematoda

Schistosoma species

Paragonimus species

Fasciola species

Clonorchis species

Class Cestoda

Hymenolepis nana

Taenia saginata
Taenia solium
Diphyllobothrium latum
Echinococcus species

WEEK 12: Exam 3 (Fungi through Parasitic worms)

Introduction to the Viruses

General characteristics

Obligate intracellular pathogens

General structure

Nucleic acid, protein capsid, lipid envelope

Capsid shapes (helical, complex, geometric)

Size

How to classify

Replication cycle

Lytic versus lysogenic

Oncology relationships

Viruses that cause cancer

Oncogene hypothesis

WEEK 13: Introduction to the Viruses continued

Cultivation of viruses

Control of viruses

Major viral groups

Single stranded DNA

Double stranded DNA

Single stranded RNA

Double stranded RNA

WEEK 14 or 15: Final lecture exam (75 % Comprehensive, with 25 % new material on Viruses)

Grade Method and Scale:

I follow the standard TCC grading scale.

A = 90-100

B = 80-89

C = 70-79

F = below 70

Explanation of Evaluation:

The average of the three Midterm Exams: 40 % of the course.

The Final Exam: 30 % of the course.

The remaining 30 % is represented by the laboratory exams, and will be discussed in the laboratory syllabus.

Statement on the Assessment Process and Measurements (LECTURE):

Exam questions on all lecture exams and the final exam will be multiple choice, scantron graded (the student supplies the ParScore scantron) Exam format may be altered as necessary, with adequate notification given to students. Each lecture exam will consist of 50 questions; the final exam will consist of 75-100 questions.

Students are asked NOT to write anything on the back of their scan tron prior to or during any exam.

Questions on the exam will NOT be answered/confirmed during or directly after the exam. Exam will be open for review and discussion at a later date.

Grades will be made available as soon as possible, and will be posted on Scholar 360. Class ethics officers may have access the exam key, and may discuss correct answers. Students may have access to the scan tron key only. While there is no time limit as to when the keys are available during the trimester, keys may not be accessed once final exams begin.

Actual exam papers are not handed back, and are destroyed after the exam. Scantrons are kept on file.

Extra credit: There is no extra credit.

Policy and Guideline Information:

Attendance: NOTICE!!! I take roll, and record your attendance for each class meeting.

Regular and punctual attendance at all scheduled classes and laboratories is expected. A student is subject to academic penalty if absences exceed ten percent. Absences exceeding twenty percent subject a student to dismissal from a course. Three (3) incidences of tardiness may constitute an absence. If justifiable cause can be shown for the absenteeism, the student may be permitted to make up missed assignments and maintain enrollment in the class. For this class, 10 % of the lecture is 5 absences (5 lecture hours, 5 lab sessions, or a combination). The 6th will get you dropped a letter grade. 20 % of this class is 10 absences (10 lecture hours, 10 lab sessions, or a combination). The 11th will get you withdrawn failing (WF) from the course.

Missed Examinations:

Students must notify faculty before missing any examinations. If an examination is missed for good and sufficient reason and the student has notified the faculty member in advance, a make-up examination may be given subject to a fee of \$40.00. The fee for the make-up examination is a minimum of \$75.00 if a standardized patient is required for the exam. Additional standardized patient hours may increase this \$75.00 minimum fee. All intra-term examinations must be made up prior to final examinations. Missed final examinations must be made up within the first week of the next trimester. A student may be allowed a maximum of two missed examination dates for good and sufficient reason per trimester. These two missed examination dates are for all enrolled courses in a trimester, not for each individual course. Any request for additional make-up examinations will require documentation substantiating the absence and must be approved by the Dean of Academic Affairs.

Cellular Phones and Pagers: NOTICE!!! I take cell phones.

Electronic communication devices are to be turned off or placed in silent mode when entering the classroom. This will benefit the learning environment for you, your fellow classmates, and instructors. In this class, any unauthorized beeping or buzzing will result in the loss of the cell phone or beeper/pager for the rest of the day. Doodling on any electronic device during class (checking cell phone messages, text messaging, etc) will also result in the loss of the device.

Re-entry into the classroom:

Students will be asked not to re-enter the class room should they leave for any reason during lecture. Constant wandering in and out is distracting to the professor and to the class. If you must leave the class room, do not return until class is over.

Exam Protocol: specific for this class

Students will be expected to do their own work during exams. Cheating will not be tolerated, and will result in the student being taken before Academic Affairs. Students will be asked to sit in every other seat in the examination room. All non essential materials (pocket books, back packs, coats, etc) will be placed in the front of the class room. Hats may be worn, but turned. No cell phone or pager will be allowed out on the desks.

NOTE: the laboratory syllabus is a separate document.

NOTICE: Summer 2010 will be the last time General Microbiology 2323 will be offered. Due to curricular changes, starting Fall 2010, General Microbiology lecture will be combined with Immunology, and the laboratory portion of the course will be dropped. Should you fail General Microbiology or Immunology, you will be enrolled in the newly adapted combination course.