COURSE ITEMS

TITLE & CREDIT: Biol – 251, Microbiology for the Health Sciences. Lecture, 3 semester credits, no lab.

DESCRIPTION: This course will survey both general and medical microbiology. It will emphasize medical microbiology and place it in perspective with the whole of human health. This class is not a course in clinical microbiology, and will not be used to substitute for a course that covers in detail the signs, symptoms, diagnosis and treatment of infectious diseases.

OBJECTIVES: This course is likely your first exposure to microbiology, but hopefully not your last. Therefore, we will use our time to emphasize the important foundation concepts that will later allow you to use and apply microbiological principles whenever necessary. I will present many meaningful, applicable details and examples of the interactions of microorganisms and humans. Unfortunately, most of the interactions that we study in this course are the harmful ones.

PREREQUISITES: Students taking this course should have already completed a basic biology course (e.g. Bio 101) and a basic chemistry course (e.g. Chem 104), OR, Anatomy and Physiology. Microbiology is not an entry-level course and students taking this course without doing well in the recommended prerequisites often do poorly. If you are at all deficient in Chemistry, then I strongly recommend you review Chapter 2 in your text on your own.

FORMAT: This course will be conducted in a manner somewhat like a typical science class. However, I will provide you with detailed reading assignments before class, and you should plan to do that reading before class. I will lecture as necessary, but you are encouraged to ask questions about your readings. Attendance at lectures is essentially required and you will be expected to participate in class activities. I would rather talk with you than lecture at you. Tape recording of lectures (without medical justification and my approval) is prohibited!

I recommend you come to class fully prepared for each discussion by taking modest notes, and reviewing your notes using your class outline and your text as guidelines. Material for examinations will be taken primarily from class lecture/discussion activities.

CLASS MEETINGS: 11:40 am - 12:40 pm, MWF, LA 205.
Eating and drinking is not permitted in this classroom, and we will abide by this restriction.

INSTRUCTOR ITEMS

INSTRUCTOR: Michael Dennis
Office: Science Room 136
Phone and voice mail: 657.2016
Email: mdennis@msubillings.edu
Home Page: www.msubillings.edu/sciences/dennis/
I attempt to answer voice mail and email messages as promptly as I can.

OFFICE HOURS: MWF: 8:30-9:00 am & 10:30-11:30 am..
Other hours by appointment, or whenever you can catch me in my office.

CONSULTATIONS: I encourage you to visit with me often to keep track of your progress in class. Although it is your responsibility to monitor your own progress, I will keep you advised of your status if you ask. I am willing to discuss your daily work, exams, preparation for class, or any items you wish. Just stop in to see me, or make an appointment if necessary.
EVALUATION ITEMS

PROBLEMS: There may be written questions that will be answered in class and that will be graded. These will be unannounced and are designed to enhance attendance and ensure you keep up with your microbiology on a daily basis. These will be graded for credit and will be part of your interim exam scores. If you miss class these cannot be made up: No excuses.

EXAMS: There will be five interim examinations, four given during class periods. They will be timed to approximately 30-60 minutes. Exams will be worth approximately 30-60 points. Exams will not necessarily be worth the same credit. Exam#5 will be part of the final exam.

There will be a Comprehensive Final Exam worth approximately 150 pts.

ASSESSMENT: You have two ways to earn your final grade in this course:
1 - Grade based entirely on the comprehensive final examination.
2 - Grade based on interim exams and the final.

Please note that I will give you the highest grade you earn by either of the methods. I usually 'curve' grades, but use of a curve is at my discretion and the curve for the two grading methods may differ. I will likely include a significant curve for method 2. (i.e. I prefer consistency and will reward a student who does well on all exams.) But there is no fixed grade scale: Final grades are determined at my discretion. You are encouraged to consult with me about your grade whenever you wish. I am willing to give you an approximation of your grade whenever you ask. However, final grades can be determined only after the course has been completed and I have thoroughly evaluated all work for all students.

Remember the words of the famous philosopher Yogi Berra: "Predicting things is hard, especially about the future."

The percent of past students earning a particular grade is as follows:
A=20%  B=30%  C=30%  D=10%  F=10%
Passing this class may be hard work, but it is clearly possible.

STANDARDS: My interpretation of the university grading scale is as follows:
A = Excellent Thorough understanding of all major concepts; and, concepts supported by extensive details.
B = Good Thorough understanding of most major concepts; and, concepts minimally supported by details.
C = Average General understanding of most major concepts; but, deficiency of, or errors in, many details.
D = Barely Passing Weak grasp of even major concepts; or, extensive errors in concepts and details.
F = Failure Weak grasp of concepts and many errors in details.

ACADEMIC HONESTY: It is your responsibility to familiarize yourself with the Student Affairs Handbook (in particular Part X, B.1, Academic Misconduct). All students are expected to adhere to the highest standards of academic honesty and refrain from any action which is dishonorable or unethical. In all exams, daily work, preparation of notebooks, etc., students are expected to prepare/submit their own work entirely. Any cheating or alleged cheating or unethical conduct in this class will result in a grade of 'F' for the course. I am the final judge for determining cheating and grades.

STUDENT ITEMS

TEXT: Microbiology, Nester et al, 4e, 2004 (or any recent micro text). The purchase of a textbook is required. It is essential that you have your own book and that you use it well. It is difficult, maybe impossible, to fully comprehend and appreciate the breadth, complexity and depth of microbiology without using a good text. I believe the assigned text is a good
one. You may use another text if you have one, but you are then responsible for making adjustments to the reading guidelines that I provide for you.

DISABILITIES:  Students with disabilities should contact Disability Support Services so that appropriate accommodations can be made as quickly as possible.

ATTENDANCE:  Attendance is expected. I do not take roll, but if you miss class you will not be able to make up unannounced quizzes.

READING GUIDE: Use the following as a guide for the intensity of your reading effort:

- **Read very carefully** = Read and study hard, even the details. The material is very important and fundamental to basic microbiology.
- **Read carefully** = Read and study well, even the details. The material is important and will be used at later times in the course.
- **Read** = Read and understand the concepts well. The concepts are important but the excessive details are not worth memorizing.
- **Review** = Read for background and perspective. The material is valuable, by providing insight, but it is not essential to 'study' it.
- **Summarize** = Read superficially if time permits. The material is interesting or informative, but may not be covered in class.
- **Skip** = We will not cover this in class.

EXPECTATIONS: You will be expected to prepare for daily classes and actively participate in class discussions. Each class should require 1-3 hours of preparation. If you are spending more than 3 hours you may be trying to do too much! You will be constantly making decisions about what to study, and to what degree. Frankly, that is what I expect you to do.

There will be interim exams and a comprehensive final. Missed quizzes cannot be made up. The final exam will be given only at the scheduled time. The final exam will be challenging: I strongly recommend you keep up with discussions and reading from the text rather than try to "cram". There is no additional extra credit available; no exams will be dropped. You must take all exams and the final. Because it is in your best interest, I recommend that you try to do well in all aspects of this course, which includes taking exams on schedule.

RESPONSIBILITY: Education is not a guarantee. It is an opportunity.
Education is not received. It is achieved.

I expect you to become an active participant in the learning process. Passive learning (i.e. cramming for exams) works only for short-term memorization and will not benefit you when you actually need to use microbiology as an advanced student or as a professional. I am responsible for guiding you and helping you achieve the goals you set for yourself. You are responsible for your progress in this class. How far you progress is ultimately your responsibility.

In this course, competency and academic growth are as important as the ability to do well on an exam. Grading is therefore based on demonstration of competency. To do well you must be disciplined and willing to be thoughtful and expressive. Your continued enrollment in the course constitutes your understanding and acceptance that grades will be determined at the discretion of the instructor.

RECOMMENDATIONS: I recommend you proceed as follows:

- Prepare for class sessions a day (or more) in advance of class.
- Prepare by reading the assigned material using the guidelines provided.
- Prepare a notebook of your work (i.e. class notes).
- Come to class ready to listen...not to take notes.
- Come to class ready to think...not to be lectured to.
- Come to class with answers...not just questions.
I. Foundations of Microbiology
   A. Introduction to Microbiology
      1. A brief history of microbiology
      2. Contemporary microbiology and the roles of microbiologists
   B. Microbial Diversity
      1. Microscopy and staining
      2. Procaryotic and eucaryotic organisms
      3. The nature of viruses

II. General Microbiology
   A. Chemical and Functional Microbial Anatomy
      1. Eucaryotic cells: Summary
      2. Procaryotic cells: Membranes, walls, spores, flagella, pili, capsules
   B. Microbial Nutrition and Growth
      1. Physical and chemical requirements for growth
      2. Culture media and cultivation of microorganisms
      3. Microbial growth
      4. Methods of chemical and physical control of microbial growth
   C. Microbial Metabolism
      1. Introductory concepts: Metabolism, enzymes and redox reactions
      2. Energy trapping metabolic pathways
      3. Biosynthesis and use of metabolic energy
   D. Microbial Genetics
      1. Structure and function of genetic material
      2. Genetic variability and transfer of genetic information
      3. Genetic engineering and contemporary biotechnology
   E. Viruses
      1. Anatomy
      2. Replication

III. Applied and Environmental Microbiology
   A. Industrial Microbiology
   B. Food Microbiology
   C. Water and Sewage Microbiology

IV. Medical Microbiology
   A. Principles of Infectious Disease
      1. Normal flora
      2. Symbiotic and parasitic relationships
      3. Pathogenicity and virulence
   B. Epidemiology
      1. Basic language and principles of epidemiology
      2. Disease transmission
   C. Host Parasite Relationships
      1. Mechanisms of pathogenicity
      2. Mechanisms of immunity
   D. Antimicrobial Chemotherapy
      1. Introduction
      2. Spectrum of activity
      3. Mechanism of action of selected antibiotics
   E. Microbial Diseases
      1. Respiratory System
      2. Digestive System
      3. Nervous System
      4. Urinary and Reproductive Systems
      5. Cardiovascular and Lymphatic Systems
      6. Skin, wounds and eyes
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IMPORTANT NOTES:

1 - We may deviate from this schedule, but only in minor ways. We may fall behind slightly, but we will finish the entire course! Changes in the schedule will be announced in class. You can plan on this schedule as a way to keep up with your reading. Exam dates may be changed at the discretion of the class (a 2/3rds plurality), or by me, if done in advance.

2 - A detailed reading guide will be handed out (in advance) for each Session. The reading guide should be used as follows:

- Read very carefully = Read and study hard, even the details. The material is very important and is core material to basic medical microbiology.
- Read carefully = Read and study well, even the details. The material is fundamentally important and will be used at later times in the course.
- Read = Read and understand the concepts well. The concepts are important but the details are not really worth memorizing.
- Review = Read for background and/or perspective. The material is worthwhile, it helps provide insight, but it is not essential to ‘study’ the material.
- Summarize = Read superficially if time permits. The material is interesting or informative, but may not be covered in class.
- Skip = We will not cover this in class.

3 - We will have our final exam at the scheduled time. Do not make plans to leave town before the final exam. It will be given at the scheduled time only.

4 - We will do the material for the first exam (basic biology of microorganisms) very quickly! We will, however, come back to much of this information when we cover infectious diseases. The material for the second exam covers some very important items that relate to medical microbiology (e.g. viruses) and you need to know it well. The material for the third exam is fundamental to understanding medical microbiology (e.g. immunology) and you must know it very well. The fourth and fifth exams cover infectious diseases: Be aware that there are a lot of them and there are a lot of details to remember and understand.

5 - If you have any questions about the structure of the course, or my expectations of your progress, it is best to meet with me earlier in the semester rather than later. I am eager to help anyone who seeks my assistance, but I cannot be more interested in your growth than you are.

6 - I view my role in this course as both instructor and advocate. However, I expect you to assume major responsibility for your academic progress in this class, including preparation for daily work and the exams. Keep the following in mind when you are studying:

- Exams will cover the lecture and reading material. It is best to study lecture material for its importance and not to try to just guess what questions will be on an exam.
- Exams will be very challenging. Some exam questions will be difficult. However, exam questions are never intended to be tricky or deceitful.
- It is my intent to make exams challenging! It is not my intent to inhibit your growth. Rather, it is my intent to have realistically high expectations of you because there are high expectations (e.g. by the professional nursing faculty) of what this course is supposed to be and do for you.
- There are a great many ‘facts’ that must be learned. Whenever possible it is to your advantage to understand those items rather than just memorize them.