**MICR 350 GENERAL MICROBIOLOGY**
**SPRING 2013**

**Instructor Information:**
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**Course Information:**
Course: Micr 350 General Microbiology  
Location: Stevens 230  
Day and Time: 3:30-4:45 PM Tues, Thurs  
Office hours: please email to make an appointment

**Text:** Wessner, "Microbiology" edition 1, ISBN 978-0-471-69434-2 (hard cover); ISBN 978-1-1181-2924-1 (binder-ready version); or ISBN 978-1-1185-4798-4 (e-book). A copy of the textbook will be on reserve in the library. The text will be used for reading assignments and pre-class activities. This is a new text and may not be available at the start of the course.

**Required Supplemental Material:** A novel, “The Hot Zone” by Richard Preston ISBN: 0-385-49522-6. The book will not be needed until after spring break and will be available in the bookstore or as an e-book through online sources.

**Course Website:** Students are expected to have an NDSU e-mail address and use the "blackboard" system https://bb.ndsu.nodak.edu/webapps/portal/frameset.jsp for this course. Announcements, handouts, assignments, quizzes, grades and miscellaneous information will be posted at this site. Please notify the instructor if help is needed to navigate the blackboard site. All correspondence with the instructor **MUST BE** through an NDSU e-mail account. Please use “Micr 350” in the subject line of all e-mails.

**Course Objectives:** Microbiology 350, General Microbiology, is intended for students majoring in microbiology, biological sciences, physical sciences, pre-professional programs, food safety, biotechnology, medical lab science, as well as anyone with a keen interest in the microbial world. The course is a prerequisite for almost all other microbiology courses.

To develop a basic understanding and overview of the microbial world by examining the six core themes recommended by the American Society for Microbiology Conference on Undergraduate Education (ASMCUE)

- Theme 1: Evolution  
- Theme 2: Cell Structure and Function  
- Theme 3: Metabolic Pathways  
- Theme 4: Information Flow and Genetics  
- Theme 5: Microbial Systems  
- Theme 6: Impact of Microorganisms

To develop an understanding of the importance of microbiology in daily life  
To use basic microbiological information to enhance critical thinking skills to problem-solve  
To take personal responsibility for academic success  
To develop the ability to think independently and discuss microbiological issues in an intellectual and informed manner

**Course Policies:**

a. **Attendance:** expected. Required to receive activity points.

b. **Academic responsibility:** this course adheres strictly to the NDSU University Senate Policy (section 335) Code of Academic Responsibility and Conduct http://www.ndsu.edu/fileadmin/policy/335.pdf and with the College of Agriculture, Food Systems and Natural Resources Honor System http://www.ag.ndsu.edu/academics/honor-system-1. It is the responsibility of each student to follow the academic code including the reporting of incidences of academic misconduct.

c. **Mission Statement for Department of Veterinary and Microbiological Sciences:**
   "VMS serves the local, national and international communities by teaching the concepts and applications of microbiology in a student-centered environment and by using our unique expertise to explore novel research in microbiology and disease pathogenesis. Our department values lifelong discovery, intellectual integrity, collegiality, and diversity."
d. Students are expected to display respectful behavior at all times towards other students and the instructor. Cell phones may be left on “vibrate mode” to receive messages from the notifind system. The use of electronic devices to text message, watch videos, web-surf etc. is rude and absolutely not tolerated in class. Personal laptop computers may be used for Micr 350 activity only. Any misuse of electronic devices should be addressed to the instructor immediately and offending parties will be asked to either leave the devices on the instructor’s desk during class or not attend class.

e. Disabilities: Any student with disabilities or other situation requiring special accommodations in this course is invited to share these concerns with the instructor as soon as possible. PLEASE visit with Disability Services for special testing accommodations as soon as possible.

f. Service to America consideration: “Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.” (Policy 331.1 Course Syllabus)

g. Examinations:
   1. Examination dates:
      Thursday, February 7    Thursday, March 7    Thursday, April 11
      Please note that examination dates are subject to change. Adequate notice will be given if this is the case.
   2. Exams will consist primarily of multiple choice, short answer, essay, matching, and fill-in-the-blank.
   3. Instructor will inform students as to the material included in each exam.
   4. Material from the lecture will comprise the majority of the test material, but questions on textbook material may also be included.
   5. Students are expected to take examinations at the designated date and time. Make-up exams will be allowed only in the case of serious illness or personal crisis and written documentation supporting the request is required. A make-up test may consist of short answer, essay or oral examination.
   6. Students are required to present photo identification at the time of each exam.
   7. In case of inclement weather and cancelled classes on a test date, the exam will be held the following class period.
   8. The final exam will be comprehensive but will emphasize untested material. The final exam will be held on Tuesday, May 7 10:30 AM- 12:30 PM.

h. Online quizzes: Online quizzes will be posted on the course blackboard website. There will be no points assigned for these quizzes as they are intended to reinforce course material and prepare the student for examination. Posting dates for the quizzes will be announced in class.

i. Pre-class and Class activities: There will be a variety of “unannounced” individual and group class activities worth 5 points each. There may also be announced pre-class activities which must be completed before class begins each day. Students will be allowed to miss 1 activity without penalty. If a student participates in all class activities they will receive an “extra” 5 points at the end of the semester. Attendance is required to receive these points.

j. Short writing assignment. One short writing assignment, worth 20 points, is required of all students during the semester. The topic and due date will be provided at the time the assignment is given. This assignment will be discussing some aspect of microbiology and may ask for you to express opinions or provide facts on the topic. The assignment should be approximately 2 pages typed, one and one-half-spaced, and may be submitted via the course website, e-mail, or in class. Under no circumstances will plagiarism be tolerated. Demonstrated plagiarism will result in a grade of 0% on the paper and a visit to the CAFSNR Honor Commission. Any literature directly used in the essay must be referenced at the end of the text. NDSU’s "Center for Writers" can assist you in improving your writing skills. Please pay close attention to the topic and due date as they will vary among students.

k. “Microbes are special” reports: Students are to submit a current (not older than 2 weeks) news story from any source (newspaper, magazine, website, radio, television, etc.) through e-mail or in class. The story and story source must both be included. Your name and ID should be written in the upper left-hand corner of the article. Each of the stories will be due during these specific periods.
   Jan 10-22   Jan 31-Feb 12   Feb 21-Mar 5   Mar 21-Apr 2   Apr 11-23
To gain an understanding of microbiology in literature, you will be required to read and assess a novel. Assessment of the novel may be in the form of discussion group participation, exam questions or short in-class activities.

There is no extra credit offered in this course other than the previously mentioned.

Study sessions will be held as needed and as requested by students. You are welcome to contact me by phone, by e-mail or in person for assistance in this course, about other questions, concerns, guidance or just to visit.

Students are responsible for the accuracy of their grades. Any discrepancies must be reported to the instructor within two weeks of the assignment, quiz, exam, etc.

**Grading:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Examinations</td>
<td>3 @ 100 points</td>
<td>300</td>
</tr>
<tr>
<td>Final examination</td>
<td>1 @ 100 points</td>
<td>100</td>
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<tr>
<td>Class/pre-class activities</td>
<td>10 @ 5 points</td>
<td>50</td>
</tr>
<tr>
<td>Short Writing assignment</td>
<td>1 @ 20 points</td>
<td>20</td>
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<tr>
<td>Microbes</td>
<td>5 @ 5 points</td>
<td>25</td>
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<tr>
<td>Novel &quot;the Hot Zone&quot;</td>
<td>1 @ 20 points</td>
<td>20</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>515</strong></td>
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### Theme 1: Evolution
- Cells, organelles (e.g., mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.
- Mutations and horizontal gene transfer, with the immense variety of microenvironments, have selected for a huge diversity of microorganisms.
- Human impact on the environment influences the evolution of microorganisms (e.g., emerging diseases and the selection of antibiotic resistance).
- The traditional concept of species is not readily applicable to microbes due to asexual reproduction and the frequent occurrence of horizontal gene transfer.
- The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

### Theme 2: Cell Structure and Function
- The structure and function of microorganisms have been revealed by the use of microscopy (including bright field, phase contrast, fluorescent, and electron).
- Bacteria have unique cell structures that can be targets for antibiotics, immunity and phage infection.
- Bacteria and Archaea have specialized structures (e.g., flagella, endospores, and pili) that often confer critical capabilities.
- While microscopic eukaryotes (for example, fungi, protozoa and algae) carry out some of the same processes as bacteria, many of the cellular properties are fundamentally different.
- The replication cycles of viruses (lytic and lysogenic) differ among viruses and are determined by their unique structures and genomes.

### Theme 3: Metabolic Pathways
- Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).
- The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).
- The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
- The growth of microorganisms can be controlled by physical, chemical, mechanical, or biological means.

### Theme 4: Information Flow and Genetics
- Genetic variations can impact microbial functions (e.g., in biofilm formation, pathogenicity and drug resistance).
- Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
- The regulation of gene expression is influenced by external and internal molecular cues and/or signals.
- The synthesis of viral genetic material and proteins is dependent on host cells.
- Cell genomes can be manipulated to alter cell function.

### Theme 5: Microbial Systems
- Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.
- Most bacteria in nature live in biofilm communities.
- Microorganisms and their environment interact with and modify each other.
- Microorganisms, cellular and viral, can interact with both human and nonhuman hosts in beneficial, neutral or detrimental ways.

### Theme 6: Impact of Microorganisms
- Microbes are essential for life as we know it and the processes that support life (e.g., in biogeochemical cycles and plant and/or animal microflora).
- Microorganisms provide essential models that give us fundamental knowledge about life processes.
- Humans utilize and harness microorganisms and their products.
- Because the true diversity of microbial life is largely unknown, its effects and potential benefits have not been fully explored.