BIOL. 2125/2126  MICROBIOLOGY FOR HEALTH SCIENCES
Prerequisites: CHEM 1107/1117 Chemistry for Health Sciences or equivalent

Course Description:
Introduction to microbial world, bacteriology, virology, mycology, parasitology, and immunology. Suitable for students planning a career or interested in health sciences.

4 Credits
Lecture (2 hours) Mus 105 BIOL 2125.21 Wednesday, Friday 09:00AM - 09:50AM

Laboratory (4 hours) BIOL 2126.21 W & F 10:15 – 11:55 AM
DH 5512 BIOL 2126.22 W & F 12:45 – 2:25 PM
BIOL 2126.24 T & TH 1:15 – 2:55 PM
BIOL 2126.25 T & TH 3:15 - 4:55 PM
BIOL 2126.26 T & TH 11:25 – 1:05 PM

Dr. Vishal Soni
Office: Dickinson Hall, Room 4416 / e-mail: vsoni@fdu.edu
Office Hours: Wednesday and Friday 2:30-3.00 only by appointment

** Lab Instructors:
Dr. Vishal Soni  vsoni@fdu.edu
Dr. Josh Stout  stout@fdu.edu

Requirement:
- Lab Notebook: A small composition notebook to be used exclusively for this class.
- Lab Coat: You must obtain a lab coat. Student without lab coat will not be admitted into the laboratory.
- Students must have a FDU and a no-FDU e-mail accounts to be able to continue their education in case of an emergency. To create an FDU Webmail account, visit http://score.fdu.edu for instructions. To create a free non-FDU e-mail account, visit http://mail.yahoo.com or http://www.hotmail.com. Click on "Sign Up" The system will step you through the process of creating a new account.
- Students must check-in WebCampus at least once at week for course information and notices.
**Course Objective:**
Microbiology for the Health Sciences is an introductory course suitable for students planning a career in the health sciences. Students are expected to have some knowledge of basic chemistry and biology (at least one unit of high school biology). Students are introduced to the microbial world with emphasis on aspects of immunology, bacteriology, virology, mycology and parasitology which are relevant to the role of microorganisms in disease processes. The Laboratory will deal with the isolation and identification of common pathogenic and nonpathogenic organisms utilizing techniques of staining, culturing, fermentation reactions and microscopic inspection.

**Student Learning Outcomes:**
Upon successful completion of this course, students will be able to:

a. Demonstrate their ability to integrate knowledge and ideas in a coherent and meaningful manner by taking multiple choice and essay exams.
b. Demonstrate their ability to think critically by identifying an unknown.
c. Locate and use scientific information by preparing a research paper.
d. Effectively express themselves in written and oral form by writing and presenting a research topic.
e. Demonstrate their ability in the following laboratory skills:
   1. Use of bright field microscope including recording accurately microscopic observations
   2. Properly preparing slides for microbiological examination, including performing Gram stain, Acid fast, and other differential staining techniques.
   3. Using properly aseptic techniques for the transfer and handling of microorganisms and medical samples.
   4. Using appropriate microbiological media and test systems.
   5. Working effectively independently and in teams or groups so that the task, results, and analysis are shared by individuals and within a group

**Additional information:**

a. Your instructor will be available to discuss any issue that may be affecting your academic performance. Feel free to e-mail or call me at any time. Do not wait until the last day of class!
b. Tutorial assistance for this course is available through the Learning Center. Copies of the textbook and other materials are in reserve at the Library. Students are strongly advised to take advantage of these resources.
c. Student Counseling and Psychological Services are available to all students. Student Union Building (201) 692 2174
d. Class continuation, in case of an emergency situation where the University has to be closed, classes will continue via WebCampus, e-mail and/or other means of communication. An emergency list of students and faculty information and guidelines will be prepared and distributed to the class.
e. Student Centered Online Resource for Education (SCORE) provides technical information for all FDU systems.
f. You must contact the FDU Technical Assistance Center (UTAC) with any technical problems. UTAC can be reached at 973-443-8822 (8822 from Florham, #8822 from Metro) fdutac@fdu.edu
g. To obtain service from UTAC you will need your University ID
h. The College regulations regarding cheating and plagiarism will be strictly enforced. Tape recorders are prohibited without written permission from instructor.

Course expectations:

a. **Attendance**: Students are required to attend all lecture and laboratory sections. Lateness or absence of greater than 10% is considered excessive and could result in a lowering of your course grade.

b. **Reading assignments**: Students are expected to read all assigned chapters and/or lab exercises prior to class. Pre-quizzes will be given prior to each topic to test student preparation.

c. **Class participation**: Participation in class discussion and in all laboratory activities is expected.

d. **Uses of electronic devices**: (tape records, cell phones, camera phones, pages) are prohibit in the classroom and laboratories. Students MUST TURN their cell phones and/or pages OFF or to vibrator before entering the classroom.

e. **Use of WebCampus**: All students are expected to be familiar with WebCampus and Blackboard interface. Students must check webCampus at least once at week for course updates and instructions.

f. **Emergency course continuation**: In case of an emergency closing of the University, classes will continue via WebCampus, e-mail, telephone or other means of communication. Be prepared to follow instructions under those circumstances. Students should make all effort to have access to a working phone and/or computer in order to communicate with the instructor and their class mates.

g. **Laboratory**: Students must follow all laboratory rules and protocols
   i. No student will be permitted into laboratories wearing shorts, halter tops, open toed sandals, undershirts or any other inappropriate attire. All students must wear **lab coats** when attending lab.
   ii. Students must bring their lab manual and lab notebook to every class.
   iii. Missed laboratory **can not** be made-up. You should consult your lab partner for the information missed and results

h. **Examinations**:
   i. Students are expected to answer multiple choice questions, filling and matching, and essay questions.
   ii. Dates of examinations are tentative except for the final exam.
   iii. You will be responsible for material covered in reading assignments and in lecture. You are also responsible for knowing the FDU policy on academic integrity and for strictly adhering to it.
   iv. **SHOW UP ON TIME**. Late comers will not be given extra time to complete their exam.
   v. Make-up examinations will be provided at the instructor’s discretion if there is a valid, documented excuse and if notification is provided within 24 hours of the schedule examination.
Grading and other methods for assessing student academic performance

- **Lecture Exams:** Three lecture exams (10% each) unless otherwise stated each lecture exam will be given during the assigned (see lecture schedule) lecture period. Exam will test your knowledge of material covered in class since the last exam. You will be expected to answer multiple choice, matching, true or false and essay questions.

- **Lecture Final Exam:** (20%) Exam will test your knowledge of material covered in class during the entire semester. **You must take this exam in order to complete the course.**

- **Research Paper:** (10%) 

- **Group Project:** (15%) Each group will be given a microbiology study case. Students must research background information and try to solve their case study based on laboratory test done by the group during Lab. Specific guidelines will be given to the students at the appropriate time.

- **Lab Mid-Term Exam:** (15%) will consist of two parts: A written part (5%), which will include multiple choice, filling and short answer questions, and a practical portion where the student must perform specific laboratory techniques (10%).

- **Lab performance:** (10%) Competence in performing laboratory procedures, adherence to safety measures, and interpreting experimental results will be considered as part of your laboratory grade. Your instructor will base the evaluation on the following objectives:
  - Follow all safety rules stated in the laboratory manual.
  - Proper completion of select lab reports.
  - Demonstrate a working knowledge of the care and use of the microscope.
  - Use aseptic technique when handling cultures.
  - Demonstrate evidence of preliminary preparation (exercise outline) and organization when performing laboratory techniques.
  - Perform selected laboratory techniques safe and correctly.
  - Interpret laboratory results correctly.
  - Maintain records of all laboratory procedures, questions, explanations and experimental data obtained during lab – Lab notebook will be collected during the midterm and lab final exams.

YOU MUST PASS BOTH LECTURE AND LABORATORY TO PASS THE COURSE!

Final letter grade will be assigned according to the following grade scale.

- **A:** 94-100%, **A-:** 90-93%
- **B+:** 87-89%, **B:** 83-86%, **B-:** 80-82%
- **C+:** 77-79%, **C:** 73-76%, **C-:** 69-72%
- **D+:** 65-68%, **D:** 60-64%, **F:** ≤ 59

Any problem(s) you may have during this course should be communicated and/or discussed with the Instructor immediately, **DO NOT** wait until it is too late.

Lab issues should be brought up to the lab instructor first. If no satisfaction is achieved you may contact your Lecture professor to help you resolve the issue.
# BIOL. 2125 MICROBIOLOGY FOR HEALTH SCIENCES - LECTURE OUTLINE


<table>
<thead>
<tr>
<th>Lecture DATE</th>
<th>TOPICS</th>
<th>Reading Assignment</th>
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</table>
| Jan. 25      | Introduction to Microbiology:  
- Microbiology the Science, Scope of Microbiology  
- Historical developments and Role of Microorganisms | Chapter 1 |
| Jan. 27      | Cell Structure and Taxonomy  
- Taxonomy overview, Importance, Systems of classification.  
- Overview of cells | Chapter 3 |
| Feb. 1       | Microbial Diversity  
- Cellular microorganisms:  
  - Viruses, Viroids, and Prions  
- Cellular microorganisms  
  - Domain Archaea  
  - Domain Bacteria  
  - Domain Eukarya  
    - Algae and Protozoa  
    - Fungi  
    - Helminths | Chapters 4 & 5 |
| Feb. 3       | Microbial growth in vitro | Chapter 8 pp.124-131 |
| Feb. 8       | The Chemistry of life:  
  - Organic compounds - web. appendix 2  
  - Nucleic Acid Structure – DNA / RNA, Gene Structure and Genetic Code, Prokaryotic, Protein Synthesis. | Chapter 6 |
| Feb. 10      | Microbial Physiology and Genetics:  
  - Prokaryotic DNA Replication: Bi-directional & Rolling circle  
  - Replication Ways in which bacteria acquires new information  
  - Metabolism: Respiration, Fermentation, Photosynthesis, | Chapter 7 |
| Feb. 15      | Controlling the Growth of Microorganisms:  
  - Physical and Chemical Antimicrobial Methods  
  - Chemotherapy and bacterial resistance | Chapters 8 & 9 |
| Feb. 17      | Overview of diseases | Chapters 17, 18, 19 & 20 |
| March 21     | Interactions between Humans and Microbes  
- Indigenous Microflora and its beneficial roles.  
- Symbiotic relationships – Mutualism, Commensalisms, parasitism, neutralism and antagonism.  
- Microbial communities & biofilms  
- Interactions among pathogens, hosts and the environment. | Chapters 10 & 11 |
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<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Chapters</th>
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<tbody>
<tr>
<td>April 18</td>
<td>Pathology, Epidemiology and Public Health</td>
<td>Chapters 11, 12, 13 &amp; 14</td>
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<td>April 20</td>
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<tr>
<td>April 25</td>
<td>EXAM 3</td>
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<td>April 27</td>
<td>Immunology</td>
<td>Chapters 15 &amp; 16</td>
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<td>May 2</td>
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<td>May 4</td>
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<td>May 9</td>
<td>FINAL COMPREHENSIVE EXAM</td>
<td>*** Wednesday May 9, 2012</td>
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<td>09:00 AM</td>
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- Chain of infection, Reservoir of infection: (Living reservoir / Non-living reservoir), Modes of transmission

Infections:
- Course of an infection
- Acute, subacute, and chronic diseases
- Pathogenesis of infection diseases
- Virulence and virulence factors
- Nosocomial Infections
- Infection Control Measures and Procedures

- Pathology
  - Diagnosis of infectious disease
- Epidemiology
- Measures for prevention and control of epidemics
- Public Health Agencies

- Immunity
  - Non specific
  - Specific immune response
  - Immunodiagnostic procedures

Immune System
- Branching of the Immune System
  - Humoral Immunity
  - Cell-mediated immunity
- Types of immunity
  - INNATE IMMUNITY
  - ADAPTIVE IMMUNITY
- Vaccines and Their Characteristics
- Immunizations and their limitations
- Host defense mechanism
  - First and second line of defense
  - Third line of defense
  - Mechanisms by Which Pathogens Escape Destruction by Phagocytes
BIOL 1126    Microbiology for the Health Sciences  
Laboratory DH 5512

Requirements:


- Lab Notebook  Students must have a composition type notebook to be used exclusively for recording all laboratory procedures, questions, explanations and experimental data obtained during lab.

- Lab Coat  Students will not be admitted into the Lab without a Lab Coat.

Students must follow laboratory rules and regulations at all times NO EXCEPTIONS.

Laboratory attendance is mandatory. Students are responsible for all information given during lab periods. Due to the nature of this course, laboratory exercises can only be performed during the assigned lab period (no make-up). If a student misses a lab, he/she must obtain the giving information from a classmate.

Before each lab period, students must read the assigned material and write an outline to be delivered to the instructor prior to the Laboratory work. During lab, all material used, procedures, results and discussions must be recorded on the lab notebook. All microscopic observation must be recorded in the form of drawings on the lab notebook. Lab notebooks are going to be collected and graded during midterm and final exam periods.

After the completion of all laboratory exercises you will be given an unknown organism, which you will have two weeks to identify it. When the time comes, you will receive specific guidelines in how to do this project.

Students without Lab manual, notebook and/or lab coat will not be admitted into the laboratory.
<table>
<thead>
<tr>
<th>LAB</th>
<th>TOPIC</th>
<th>Assigned Reading</th>
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<tbody>
<tr>
<td>Jan 26/27</td>
<td>Use and care of the Microscope</td>
<td>Exercise 1 A &amp; B</td>
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<tr>
<td>Feb 1</td>
<td>Preparation of smears and simple staining</td>
<td>Exercise 2 A &amp; B</td>
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<td>Feb 3</td>
<td>Differential Staining Techniques: Gram, Acid Fast Stain</td>
<td>Sections IV &amp; V Exercises 14 A, 15 A.1, 16, 17 &amp; 18 A &amp; B.</td>
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<td>Feb 7/8</td>
<td>Cultivation techniques: Bacterial culture characteristics. Transfer and Colony Selection techniques; Isolation of pure cultures</td>
<td>Chapter 8 (text book) Section II Exercises 4A-C, 5 &amp; 7</td>
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<td>Feb 16/17</td>
<td>Cultivation of anaerobes</td>
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<td>March 1</td>
<td>Differential and selective media</td>
<td>Exercises 8 &amp; 20</td>
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<td>March 6/7</td>
<td>Results and Review</td>
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<td>March 8/9</td>
<td>Lab Mid Term Exams</td>
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<td>March 12-16</td>
<td>SPRING BREAK</td>
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<tr>
<td>March 20/21</td>
<td>Biochemical activities</td>
<td>Chapter 7 (text book) Section VI</td>
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<tr>
<td>March 22/23</td>
<td>Extracellular degradation of polysaccharides, proteins, lipids, and DNA. Intracellular Metabolism: Carbohydrate metabolism, Nitrogen metabolisms, Oxidase and Catalase</td>
<td>Exercises 21, 22, 23 &amp; 24</td>
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<td>March 27/28</td>
<td>Multi test Media: IMViC , Triple Sugar Agar, Litmus milk and Enterotube®II System</td>
<td>Exercises 25, 26 &amp; 27B</td>
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<tr>
<td>March 29/30</td>
<td>Control of Microorganisms by Chemical and Physical factors: Heat, pH, Osmotic pressure, Heavy metals, &amp; Antibiotics</td>
<td>Chapter 9 (text book) Section VII Exercises 29A, 31, 32A, 33A, &amp; 37A</td>
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<tr>
<td>April 3/4</td>
<td>Results and review</td>
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<tr>
<td>April 10/11</td>
<td>Results and review</td>
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<tr>
<td>April 17-May 4</td>
<td>Group project Unknown ID / Lab Final / Clean-up</td>
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