BOROUGH OF MANHATTAN COMMUNITY COLLEGE
The City University of New York
Department of Science

MICROBIOLOGY BIO420

Class Hours: 6

Lecture Hours per Week: 3

Laboratory Hours per Week: 3

Semester: Fall 2021

Instructor Information (Phone#, Office#, email)

Credits: 4

Course Description: BIO420 is an introductory microbiology class that covers the essentials of microbiology, interactions between microbes and the human host, and microbes and important human diseases. The course surveys microorganisms pathogenic to humans: their characteristics, pathogenicity and modes of transmission are studied. Laboratory instruction includes a study of the sterile technique and the culturing, staining and handling of bacteria.

Prerequisites/Corequisites: BIO 426 and CHE 118 or CHE 121, or departmental approval

<table>
<thead>
<tr>
<th>Course Student Learning Outcomes</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Students will be able to describe the characteristics of bacteria, viruses, prions and fungi.</td>
<td>1. Quizzes and examinations. Students will be assessed on their ability to differentiate between these organisms both structurally and functionally.</td>
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<tr>
<td><strong>2.</strong> Students will be able to describe: DNA replication; protein synthesis; gene expression and mutation; genetic mechanisms of drug resistance.</td>
<td>2. Quizzes and examinations. In particular, students’ understanding of different types of mutations and the ways in which drug resistance arises will be assessed.</td>
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<tr>
<td><strong>3.</strong> Students will be able to describe the mechanisms of host resistance and immunity.</td>
<td>3. Quizzes and examinations. Questions on the exam will assess students’ understanding of the interactions between different aspects of innate and adaptive immunity.</td>
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<tr>
<td><strong>4.</strong> Students will be able to identify the major bacterial, viral and fungal pathogens and understand the interaction between host &amp; pathogen.</td>
<td>4. Quizzes and examinations. Questions on the exam will include case-study approaches to assess students’ understanding of how important diseases are transmitted, the pathology of the diseases, and treatment of the diseases.</td>
</tr>
<tr>
<td><strong>5.</strong> Students will be able to culture, stain, and handle bacteria with emphasis on safety and sterile technique.</td>
<td>5. Written laboratory reports and assignments. Improvements in clarity and organization of reports will be monitored. Students will also be given a practical exam in which they will be asked to (i) identify different staining techniques, (ii) describe techniques used for obtaining a pure cultures and (iii) understand the Kirby-Bauer method used for determining antibiotic sensitivity.</td>
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</tbody>
</table>
Below are the college’s general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)

<table>
<thead>
<tr>
<th>General Education Learning Outcomes</th>
<th>Measurements (means of assessment for general education goals listed in first column)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Reasoning - students will be able to apply the concepts and methods of the natural sciences.</td>
<td>Students will assimilate class and laboratory information in order to answer questions related to biology orally and in written form.</td>
</tr>
</tbody>
</table>

**Required Lecture Text:**
Title: Nester’s Microbiology: A Human Perspective  
Authors: Anderson, Salm and Allen  
Publisher: McGraw-Hill Publishing  

Lecture Text buying options (Connect is required for this class):

1. Direct from McGraw-Hill via Connect URL (See page 6 for instructions on how to purchase via Connect website):
   a. Connect only - $87.50
   b. Loose-leaf textbook with Connect access - $112.50 net
      OR
   Nester’s Microbiology; Connect with LearnSmart Labs access card - $158.55

**Required Laboratory Text:**
Title: Microbiology: A Laboratory Manual  
Authors: Benavides, Salm, Thompson, Zaitsev and Fernández Romero  
Publisher: Morton Publishing  
Edition: 2e, 2020  
ISBN #: 978-161731-8450

Laboratory Manual buying option:

1. Only available at BMCC bookstore - $40.33

**Other Resources**

**Use of Technology:** Blackboard, Connect

**Evaluation and Requirements of Students:**
Lecture Examinations  
Laboratory Examinations  
Other Assignments  
Final Examination
Class Participation
Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student’s responsibility to be familiar with and follow the participation policies for each course.

BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

BMCC Mask Mandate Policy for In-Person Classes
CUNY has put in place a temporary mask mandate policy that requires the wearing of masks indoors in all campus buildings. See: https://www.cuny.edu/coronavirus/university-updates/clarity-new-mask/

Face masks help prevent the spread of COVID-19. As it is possible to have or carry the coronavirus without having or showing symptoms, it is necessary for every person in our community to wear a mask even if you are fully vaccinated and/or have tested negative for COVID19, or think you are completely healthy. For appropriate/acceptable masks and guidelines on use, see CDC guidelines at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html.

While the mask mandate is in effect, the following will apply to all in-person classes (including in-person classes associated with hybrid courses):

- In a classroom, if a fully vaccinated instructor is teaching a class and can maintain social distance from all others in the classroom, he/she may choose not to wear a mask (subject to any additional Department guidelines regarding the use of face shields or other layers of protection).
- Students who attempt to enter a classroom without wearing masks will be asked by the instructor to put on their masks before entering. Students who remove their masks during a class session will be asked by the instructor to put on their masks. Masks will be available for distribution for those who need one.
- Students may remove their masks momentarily during class (to drink something quickly), in classrooms other than labs, but must replace their masks immediately after that. The consumption of food is not permitted in any classroom or lab.
- Students who are not fully vaccinated are also required to maintain social distancing between themselves and all others in a classroom.

Advocacy and Resource Center (Former Single Stop) Center https://www.bmcc.cuny.edu/student-affairs/arc/, room S230, 212-220-8195. If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, come by the Single Stop Office for advice and assistance. Assistance is also available through the Office of Student Affairs, S350, 212-220-8130.

Counseling Center www bmcc.cuny.edu/counseling, room S343, 212-220-8140. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

Office of Compliance and Diversity www bmcc.cuny.edu/aac, room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC's policies and resources, or to request
additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

Office of Accessibility  www.bmcc.cuny.edu/accessibility, room N360 (accessible entrance: 77 Harrison Street), 212-220-8180. This office collaborates with students who have documented disabilities, to coordinate support services, reasonable accommodations, and programs that enable equal access to education and college life. To request an accommodation due to a documented disability, please visit or call the office.

BMCC Policy on Plagiarism and Academic Integrity Statement
Plagiarism is the presentation of someone else’s ideas, words or artistic, scientific, or technical work as one’s own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC’s Web site,  www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).

Lecture

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>PAGES IN TEXT BOOK</th>
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</table>
| 1    | Humans and the microbial world  
Prokaryote cell structure | Chapter 1: 1-18  
Chapter 3: 44-56*** (microscopy techniques)  
Chapter 3: 57-77 (prokaryote cell structure)  
*** Optional pages – these may be covered in lab session by your instructor |
| 2    | Microbial growth  
Control of Microbial growth | Chapter 4: 92-109 (microbial growth)  
Chapter 4: 110-115*** (methods to detect growth)  
Chapter 5: 119-138 (control of growth)  
*** These pages may be covered in lab session by your instructor |
| 3    | Microbial metabolism | Chapter 6: 139-177 |
| 4    | The blueprint of life: DNA to protein | Chapter 7: 178-205 |
| 5    | Bacterial genetics | Chapter 8: 206-235  
Chapter 9: 236-258*** (Biotechnology)  
*** Optional pages – your instructor may or may not cover this section |
| 6    | Viruses, viroids and prions | Chapter 13: 332-360 |
| 7    | Innate immune response | Chapter 14: 362-385 |
| 8    | Adaptive immune response | Chapter 15: 386-414 |
| 9    | Host-microbe interactions  
Immunologic disorders | Chapter 16: 415-438  
Chapter 17: 439-455 |
| 10   | Applications of immune responses  
Epidemiology | Chapter 18: 456-463 (immunization)  
Chapter 18: 464-476*** (immunologic testing)  
Chapter 19: 477-499  
*** Your instructor will indicate what he/she plans to cover in these pages |
| 11   | Antimicrobial medications  
Respiratory infections | Chapter 20: 500-530  
Chapter 21: 531-573  
* Your instructor will indicate which diseases are to be covered |
This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY’s Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapters/Sections</th>
<th>Notes</th>
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<tbody>
<tr>
<td>12</td>
<td>Skin infections&lt;br&gt;Wound infections</td>
<td>Chapter 22: 574-600&lt;br&gt;Chapter 23: 601-622</td>
<td>* Your instructor will indicate which diseases are to be covered</td>
</tr>
<tr>
<td>13</td>
<td>Digestive system infections&lt;br&gt;Blood and lymphatic infections</td>
<td>Chapter 24: 623-663&lt;br&gt;Chapter 25: 664-693</td>
<td>* Your instructor will indicate which diseases are to be covered</td>
</tr>
<tr>
<td>14</td>
<td>Nervous system infections&lt;br&gt;Genitourinary infections</td>
<td>Chapter 26: 694-727&lt;br&gt;Chapter 27: 728-766</td>
<td>* Your instructor will indicate which diseases are to be covered</td>
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<tr>
<td>15</td>
<td>Final Exam</td>
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**LABORATORY**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lab safety; Comparing Hand-Cleaning Agents (Lab Manual Sections 1 &amp; 2)</td>
</tr>
<tr>
<td>2</td>
<td>Using the Compound Microscope; Wet Mount; Aseptic Technique (Lab Manual Section 3)</td>
</tr>
<tr>
<td>3</td>
<td>Staining Procedures (Lab Manual Sections 4, 5, 6, 7 &amp; 8)</td>
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<tr>
<td>4</td>
<td>Separating a Mixture (obtaining pure culture); Microbial Growth (Lab Manual Sections 10 &amp; 17)</td>
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<tr>
<td>5</td>
<td>Effect of UV Light on Microbial Growth (Lab Manual Section 12)</td>
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<tr>
<td>6</td>
<td>DNA Gel Electrophoresis (Lab Manual Section 19)</td>
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<tr>
<td>7</td>
<td>Bacterial Transformation (PowerPoint Slides)</td>
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<tr>
<td>8</td>
<td>ELISA (Lab Manual Section 22)</td>
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<tr>
<td>9</td>
<td>Water Testing I – Selective and Differential Tests (Lab Manual Section 13)</td>
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<tr>
<td>10</td>
<td>Water Testing II – Commercial Kits (Lab Manual Section 14)</td>
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<tr>
<td>11</td>
<td>Disc Diffusion Assay (Lab Manual Section 18)</td>
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<tr>
<td>12</td>
<td>Direct Counting and Turbidity Assay (Lab Manual Section 15 and 16)</td>
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<tr>
<td>13</td>
<td>Protozoa (Lab Manual Section 20)</td>
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<td>14</td>
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STUDENT REGISTRATION/PURCHASING INSTRUCTIONS

1. Go to your professor’s section web address (provided by your specific professor)
2. Click the “Register Now” Button.
3. Select “Buy Online” or enter code from the bookstore package.

 ➢ NOTE: Connect comes with the full ebook. After enrollment in your Connect section, you will have the option to purchase the full, loose-leaf version of the print text.

• For technical issues with registration, call 800-331-5094 or go to Help