

# GENERAL MICROBIOLOGY (BIO3302) SYLLABUS

	<p><b>NEW YORK CITY COLLEGE OF TECHNOLOGY</b> The City University Of New York</p>	<p>School of Arts and Sciences <b>Department of Biological Sciences</b></p>
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Course Information	
<b>Course title:</b>	Microbiology
<b>Course code:</b>	BIO3302
<b>Credit Hours:</b>	4 credit hours
	2 hours lecture and 4 hours lab per week for 15 weeks
<b>Prerequisite:</b>	BIO 1101, BIO 2311 or Equivalent, CUNY Reading
<b>Textbooks:</b>	<b>Lecture</b> Microbiology Fundamentals: A Clinical Approach 2 <sup>nd</sup> edition, M. K. Cowan. McGraw Hill Publishing. ISBN 9781259293214 (loose-leaf)
	<b>Lab</b> Laboratory Manual, Microbiology Fundamentals: A Clinical Approach 2 <sup>nd</sup> edition, Steven Obenauf, New York City College of Technology. McGraw Hill Publishing. ISBN-13: 9781260112214

Grading Procedure (see Grading Policies for details)	
Lecture: 50% of the final grade (based on 4 one hour exams)	Lab: 50% of the final grade (based on minimum of 4 written exams and 2 practical exams)

Course Coordinators
Prof. Rena Dabydeen

## Course Description

The fundamentals of microbiology: Lectures are focused on the structure of prokaryotic and eukaryotic microorganisms, host-microbe interactions, immunity and human infectious diseases. Laboratory sessions are focused on pure culture techniques, methods of staining and the microscopic, colonial and biochemical identification of microorganisms.

## LEARNING OUTCOMES

- (1) To differentiate the major characteristics of each group of microorganisms.
- (2) To describe the major contributions of microorganisms.
- (3) To explain metabolism and microbial growth characteristics.
- (4) To explain microbial host parasite relationships.
- (5) Differentiate innate and adaptive immunity and relate the consequences of microbial invasion of these defense mechanisms.
- (6) Develop basic microbiology laboratory techniques.
- (7) Differentiate the various types of test used in identifying and classifying pathogenic microorganisms.

## Expectations

It is expected that students **MUST** attend and be on time to all laboratory sessions. Being late or absence may affect your outcome. Make up tests can be given if proper documentation is provided. Additionally, a different test will be administered and points (5-10) can be deducted.

The assigned exercises and activities for each week are given in the syllabus. Students are expected to familiarize themselves with the reading material prior to lab. Labs will typically begin with Power Point presentations of the topic. Slides and other materials will be available online on Blackboard. You are responsible for downloading and making your own copies. If there are problems with downloading the online information please contact the help desk. **PLEASE NOTE THAT THE POWER POINT SLIDES WILL NOT REPLACE THE ASSIGNED READINGS OR LECTURES.** However, most of the material for exams will come from the power point slides and lectures.

## Exams

There will be at least 4 test and weekly quizzes. Exam and quiz formats will include multiple choice, short answer, fill-ins, drawings, labeling etc. The final exam will not be cumulative. The answers to every exam will be discussed. Sometimes mistakes are made when grading. If you feel your exam was graded in error, you can request a re-grade. Tentative **Exam dates, not quizzes**, are also indicated on the syllabus. The final grade given to your lecture professor will be calculated as 50% of your overall course grade.

### Laboratory Schedule

	EXERCISE	PAGES
Week 1	1. Laboratory Safety. The use and care of the microscope. Review of the Metric system. 2. Aseptic Techniques. Inoculation and transfer techniques. Streak plate.	3, 7, 17, 25
Week 2	3. Introduction to Staining and Simple Stain. Morphological features of bacteria – discussion only. 4. The Gram stain. Bacterial anatomy – discussion only.	59 77
Week 3	<b>Test 1</b> 5. The Acid-fast stain (Ziehl-Neelsen). 6. Endospore and capsule staining. Negative staining.	85, 91, 71, 67
Week 4	7. Review of Gram Staining and Streak Plate methods. Isolation of pure culture. 8. The use of Enriched, Selective and Differential media – BA, MS, MC, PEA.	77, 25 99, 105, 117
Week 5	<b>Test II</b> 9. Epidemiology and related topics. Universal Precautions (discussion). 10. Practical Exam 1.	
Week 6	11. Biochemical Activities – Discussion. Extracellular degradation, Hydrolytic Enzymes. 12. Carbohydrate fermentation: Phenol red broth and Triple Sugar Iron (TSI) agar.	245-257 267, 273
Week 7	13. IMViC test. Multiple Test Systems: SIM, Litmus milk, 14. Urease test, Nitrate reduction test, Catalase and Oxidase test.	285, 279 295, 301, 149, 155
Week 8	<b>Test III</b> 15. Miniature Systems – Enteropluri Test and API. Review of Biochemical tests. 16. Written Exam 2. The Fungi - Molds, Yeast and Mushrooms.	231 45
Week 9	17. The protozoa. 18. The effect of Temperature and pH on microorganisms.	39, 195
Week 10	<b>Test IV</b> 19. Atmospheric Oxygen Requirements. Cultivation of Anaerobes. 20. The inhibitory action of heavy metals*. The inhibitory action of disinfectants.	143

Week 11	21. Antibiotic susceptibility testing: The antibiogram. 22. Immunology: Discussion (Antigen-antibody reactions), Agglutination (Stapho rex), Precipitation and ELISA.	167 225, 219
Week 12	<b>Test V</b> 23. Written Exam 3. Practical Exam 2 – Cultivation of unknowns. 24. Practical Exam 2 continues.	309
Week 13	25. Practical Exam 2 concludes. Pathogenic Microorganisms of the Skin*. 26. Microorganisms of the Mouth and Dental Caries*. Pathogenic microorganisms of the Gastrointestinal Tract. Activities with Blood agar and <i>Streptococcus</i>	
Week 14	27. Pathogenic Microorganisms of the Respiratory Tract*. 28. Pathogenic Microorganisms of the Urogenital System and Sexually Transmitted Diseases (STDs)*.	
Week 15	29. Helminthology. 30. Final Written Exam.	203

\* Discussion or limited exercises. Supplemental materials to be provided. Read Cowan's Textbook.

## Grades

### Final lab grade will be based on

<b>Tests</b>	<b>70%</b>
<b>Post lab</b>	<b>10%</b>
<b>Practical</b>	<b>20%</b>
<b>Total</b>	<b>100%</b>

## Assignments

You are responsible for assigned exercises. For lab topic there will be online assignment on BB. You have two opportunities to complete each one. The higher score will be used to calculate your grade. The assignments will generally cover material discussed during lab. You will be responsible for two laboratory write ups. These will be required for the practical exams. The format will be given in subsequent sessions.

## General notes

1. Absolutely no eating and drinking in the lab. Do not walk in with a bottle of drink or a container with or without food in lab.
2. Your cell phones must be turned off during lab.
3. Everyone must follow all laboratory safety rules and guidelines.
4. Respect for all is greatly appreciated.
5. Avoid walking back and forth in the lab. Take care of all your needs before you get to the lab.
6. WHITE COATS ARE MANDATORY. NO EXCEPTIONS!
7. Read assigned readings in advance and come prepared to ask questions and participate in class discussions.
8. Come prepared to learn.

## Tips on how to succeed in biology

1. Read assigned readings in advance. Preparing for lectures or laboratory is a good way to improve your understanding of the material.
2. Spend 3 – 6 hours of studying the course material. You must find time to study. Studying the same time at the same place works for some people. Find what works for you. Go over notes several times. Some things must be memorized, but don't try to memorize everything.
3. Re-writing your notes helps you to retain more material than just reading.
4. Budget your time wisely. Sometimes sacrificing a few hours from your daily routine to study will be rewarding.
5. Reading or studying the same material or topics from different sources helps.
6. Use the internet to your advantage. The internet is a great source for practice questions, notes, audio, video and images on related topics.
7. Be an active reader. Underline, write notes, high light key words. Make an outline of the chapter or reading assignment. It is easier to remember a few words than an entire paragraph.
8. To understand each chapter thoroughly read the title and introduction, look at the headings, subheadings, and topic sentences. Learn the boldfaced and *italicized* words. Read chapter summaries and review questions (a couple questions may come back and hunt you).
9. To get more from each chapter go through tables, charts, illustrations and graphs. A picture says more than a thousand words.
10. Take good lecture notes. If using Power point slides underline or high light important points. Write notes not given on the slide.
11. Ask your instructor what to expect; what's on test; is it essay or multiple choice; look at old exams: on the WEB, from former students, from library etc.
12. Try to predict some questions..... even write some of your multiple choice's
13. Review your notes, use flash cards, if that works for you...
14. Break long sentences into smaller one in order to memorize them.
15. Find what works for you. If you fail the first test, try changing your studying technique...

<http://www.how-to-study.com/>  
<http://www.adprima.com/studyout.htm>