

**NATURAL SCIENCES DEPARTMENT
HOSTOS COMMUNITY COLLEGE
of THE CITY UNIVERSITY OF NEW YORK**
Fall 2012

BIO 310 Microbiology

Section: **Registration Code:** ; 4 credits. 3-hr. lecture/3-hr. lab
Professor:

Meets:	
Email:	
Office:	Department of Natural Sciences
Phone:	Office phone:
Contact Policy:	

Course description:

The student will study and describe terms related to the following aspects of microbiology: history, methods of studying and cultivation, reproduction and growth, metabolism, genetics, and control. The student will also study the following topics: pathogens, resistance and immunity, bacteria, rickettsia, chlamydia, viruses, parasitology, mycology, and epidemiology

Course objectives:

By the end of the course, students will be able to:

1. describe bacterial structure / anatomical features of microorganisms and explain the metabolic and genetic processes of bacterial microorganisms.
2. describe the basic principles regarding how the human immune system responds to the presence of microbial organisms and outline the many ways microorganisms can associate with human beings
3. describe the ways human beings can control microbial growth based on our understanding of the way microorganisms interact in the environment
Objectives 1-3 will be demonstrated by student performance on exams and essays writing
4. apply standard microbial methods used to characterize, identify and control microbial growth
Objective 4 will be demonstrated by student lab work and completed lab reports
5. develop critical thinking skills, interpret scientific observations and delineate conclusions through application of theoretical knowledge gained in the course, materials collected in the library and the internet and implementation of laboratory experience
Objective 5 will be demonstrated by exam performance, lab performance, completed lab reports, writing critical analysis essays.
6. develop writing and oral communication skills as well as skills in comprehending graph/charts
Objective 6 will be demonstrated by writing critical analysis essays, writing lab reports, class participation, participation in relevant department activities.

Textbooks:

Microbiology – An Introduction. Tortora, G.J., Funke, B.R., Case, C.L.
Pearson Publishing Inc. 2012, 11-th Edition.
For loose leaf, ISBN #:0321793110
For hard cover, ISBN#: 0321767381

Microbiology Laboratory Theory and Application. 2nd ed. Leboffe, Michael J. and Pierce, Burton E..
Morton Publishing Company, 2012, Brief Edition, (loose leaf) ISBN # 9780895827050

Pre-requisites and/or Co-requisites: BIO 220 (formerly 3904) or BIO 240 (formerly 3908).

Additional reading: articles from *The New York Times* and other scholarly resources

Note: There are two course schedules at the end of this document. The first contains information for the above newer editions of the textbook (11th ed.) and lab manual (2nd ed). Immediately following is a second course schedule providing information of the older editions of the textbook (10th ed.) and lab manual (1st ed.).

Academic integrity:

Reproduced from pages 158-162 of the 2006/2007 Catalogue.

Hostos Community College believes that developing student's abilities to think through issues and problems by themselves is central to the educational process. Since the Hostos College degree signifies that the student knows the material s/he has studied, and the practice of academic dishonesty results in grades or scores that do not reflect how much or how well the student has learned, understood, or mastered the material, the College will investigate any form of academic dishonesty brought to its attention. If the charge of academic dishonesty is proved, the College will impose sanctions. The three most common forms of academic dishonesty are cheating, plagiarism, and bribery.

In the collegiate setting, cheating is defined as the purposeful misrepresentation of another's work as one's own. Faculty and students alike are responsible for upholding the integrity of this institution by not participating either directly or indirectly in act of cheating and by discouraging others from doing so. Plagiarism is a form of cheating which occurs when persons, even if unintentionally, fail to acknowledge appropriately the sources for the ideas, language, concepts, inventions, etc. referred to in their own work. Thus, any attempt to claim another's intellectual or artistic work as one's own constitutes an act of plagiarism. In the collegiate setting, bribery involves the offering, promising, or giving of items of value, such as money or gifts, to a person in a position of authority, such as a teacher, administrator, or staff member, so as to influence his/her judgment or conduct in favor of the student. The offering of sexual favors in exchange for a grade, test score, or other academic favor, shall be considered attempted bribery. The matter of sexual favors, either requested or offered, in exchange for a grade, test score or other academic favor, shall also be handled as per the Sexual Harassment procedures of the College.

If you are suspected of plagiarism or cheating or if you attempt to bribe or influence your professor, you will be immediately reported to the college's Academic Integrity Officer. You will be unable to drop the class. The penalties range from an F with a score of 0 for an assignment to Failure for the entire term to expulsion from The City University of New York.

Bribery:

In the collegiate setting, bribery involves the offering, promising, or giving of items of value, such as money or gifts, to a person in a position of authority, such as a teacher, administrator, or staff member, so as to influence his/her judgment or conduct in favor of the student. The offering of sexual favors in exchange for a grade, test score, or other academic favor, shall be considered attempted bribery. The matter of sexual favors, either requested or offered, in exchange for a grade, test score or other academic favor, shall also be handled as per the Sexual Harassment procedures of the College.

This class uses Turnitin.com to verify assignment originality. The minimum penalty in this class for plagiarism or cheating is a failing grade for the assignment in question. Students cannot rewrite papers failed for plagiarism or cheating.

College attendance policy:

Reproduced from pages 158-162 of the 2006/2007 Catalogue.

Students are expected to attend all class meeting in the courses for which they are registered. Classes begin at the times indicated in the official schedule of classes. Arrival in class after the scheduled starting time constitutes lateness.

The maximum number of absences is limited to 15% of the number of scheduled class hours per semester and a student absent more than the indicated 15% is deemed excessively absent. Attendance is monitored from the first official day of classes. In the case of excessive absences or lateness, the instructor has the right to lower the grade, assign a failing grade, or assign additional written work or readings.

Absences due to late registration, change of program, or extenuating circumstances will be considered on an individual basis by the instructor. Each department and program may specify in writing a different attendance policy. Instructors are required to keep an official record of student attendance and inform each class of the College's or department attendance policy.

In this class, exceeding 5 unexcused absences will result in failure of the course.

Students with disabilities:

If any student has a disability that requires course accommodations, please contact me by phone or email as soon as possible to discuss your situation. I will be pleased to meet with you to discuss the matter as well. If you have not already done so, you should register with the college's office of Services for Students with Disabilities located in the Savoy building in Room D101P; telephone: 718-518-4454. The office will assess your eligibility for services and / or accommodations and will work with you to plan and implement appropriate accommodations to assist you to complete requirements for this and other courses.

Need more help?

Hostos Academic Learning Center: <http://www.hostos.cuny.edu/asc/>

Current schedule is at HALC website.

Graded assignments:

The Final grade will be determined by the grades on lecture and laboratory combined as follows:

Lecture	75%
4 - 5 Exams (including the final exam)	60%
Writing Assignments	10%
Participation	5%
Laboratory	25%
8-10 Lab Reports	10%
4 – 5 Examinations	10%
Laboratory Participation	5%
Total Grade Course	100%

No student under any circumstances will be given a passing grade in this Biology course without taking and passing the laboratory. Four (4) unexcused absences to lab are equivalent to an F.

Policy Grade:

The City University of New York awards letter grades to denote the level of achievement for each course. The grading system is as follows:

Grade	GPA VALUE
A 93 – 100%	4
A- 90 – 92%	3.7
B+ 87 – 89%	3.3
B 83 – 86%	3
B- 80 – 82%	2.7
C+ 77 – 79%	2.3
C 70 - 76%	2
D 60 - 69%	1
F below 60%	0

The grade of Incomplete (I) is given in regular courses upon request of the student for personal emergencies that are verifiable. The faculty member has the responsibility to provide Inc grade only to those students **who are passing the course**. The student has the responsibility to take the initiative in completing the work, and is expected to make up the incomplete during the first semester in residence after receiving the grade of Incomplete. If the student does not make up the incomplete during the following semester after receiving it, **an F grade may be given by the faculty member without further consultation with the student**. If after

the end of the first semester the Inc remains on the record it will be designated as an F and will be computed in the student's GPA. There is no R grade in this course.

Make-up exams

If you have missed an exam, but **have a valid excuse**, you should make arrangements to take your make-up exam within two weeks of the missed exam. All make-up exams will be given on an out-of class and by appointment only.

Lecture examinations.

Some of the lecture exams will have a "take-home essay" component. Writing assignments and due dates will be discussed later in the semester. Separate documents will be provided with instructions.

Laboratory examination.

Laboratory examinations will include practical component whenever possible. Laboratory examinations may also have a "take-home essay" component.

Laboratory reports.

Laboratory reports are due as indicated at time of assignment. Instructions on writing laboratory reports are found in the Supplement .

**Writing Assignments including the "term" paper
(this will vary depending on instructor)**

You will receive detailed instructions during the semester. Some of these assignments will be completed in class. Others will be done outside of class. Due dates for the various assignments will be discussed later in the semester and a tentative timetable (schedule) will be provided shortly. It is strongly recommended that if you have not yet taken any workshops on plagiarism, research use of the internet, etc. offered by the Hostos library, that you do so this semester. They offer several different sessions during each semester.

Participation:

Your participation in class is an important part of the final grade. This grade is based primarily on your participation in class discussions, in team projects and your attendance. For each class you miss, you will lose participation points. If you miss 25% or more of the term, you will be failed. Other aspects include: punctuality and timeliness in submitting assignments.

Course schedule:

Readings must be completed for each class. Not all assigned texts will be discussed in class or covered in the class lectures. Items tagged with an * and *italics* indicate in class (low stakes) writing assignments.

Lecture exam and lab exam dates as well as what material will be covered in each exam will be provided by individual instructors. This syllabus contains information for new edition of extbook (11th ed.) and new edition of lab manual (2nd ed. .) The second syllabus contains information for old text (10th ed.) and old lab manual (1st ed.)

W K	DATE	TOPIC	READ FOR TODAY	ASSIGNMENT (see notes below regarding writing assignments and lab reports, etc.)
1	LECT. 1	Microbial World and You	Ch. 1, p. 1 – 24	p. 23-4 (selected quest.)
1	Lab 1	Introduction Intro. to light microscope Wet mounts (& hanging drop) Prep.	Introduction pp. 1-6 Ex. 3-1, pp. 126 -30 Ex. 3-10, pp. 193-194	p.131-34 and p. 195-96 (selected quest.)
2	LECT. 2	Microbial World and You Chemical Principals	Ch. 1, p. 1 – 24 Ch. 2, p 25 – 52	p. 23-4 and p. 51-2 (selected quest.)
2	Lab 2	Simple Stains	Ex. 3-4, pp. 159-61 (Stain Intro: pp. 153-57)	p. 163 - 64 (selected quest.)
3	LECT. 3	Chemical Principals Observing Microorganisms Through a Microscope	Ch. 2, p 25 – 52 Ch. 3, p. 53 - 74	p. 51-2 and p. 73-5 (selected quest.)
3	Lab 3	Gram Stain (& relationship to bacterial cell anatomy)	Ex. 3-6, p. 169-74	p. 175 - 76 (selected quest.)
4	LECT. 4	Functional Anatomy of Prokaryotic & Eukaryotic Cells	Ch. 4, p. 75 – 110	p. 109-10 (selected quest.)
4	Lab 4	Acid Fast Stain	Ex. 3-7, pp. 177 - 80	p. 181 -82 (selected questions)
5	LECT. 5	Functional Anatomy of Prokaryotic & Eukaryotic Cells Microbial Metabolism	Ch. 4, p. 75 – 110 Ch. 5, p. 111 – 152	p. 109-10 and p. 150-52 (selected quest.)
5	Lab 5	Endospore stain	Ex. 3-9, pp. 187 – 190	p. 191 - 92 (selected quest.)
6	LECT. 6	Microbial Metabolism Microbial Growth	Ch. 5, p. 111 – 152 Ch. 6, p. 153 – 180	p. 150-52 and p. 179-80 (selected quest.)
6	Lab 6	Negative Stain / Capsule Stain Colony Morphology /Growth Patterns on Slants/Growth Patterns in Broth	Ex. 3-5, p. 165-66 & 3-8, pp. 183-4; Ex. 2-2, p. 59- 66; Ex. 2-3 p. 69-70; Ex. 2-4, p.73-74.	p. 167-8 & p. 185-86 p.67-8; p. 71-2 and p. 75-6 (selected quest.)
7	LECT. 7	Control of Microbial Growth Microbial Genetics	Ch. 7, p. 181 – 206 Ch. 8, p. 207 - 243	p. 204-6 and p. 241-43 (selected quest.)
7	Lab 7	Streak plate method of Isolation (pour plate as a demonstration)	Ex. 1-5,, p. 39 -42	p. 43 – 44 (selected quest.)
8	LECT. 8	Microbial Genetics	Ch. 8, p. 207 - 243	p. 241-43 (selected quest.)
8	Lab 8	Selective Media and Blood Agar Mannitol Salt Agar (MSA), Hektoen & MacConkey (cont. next pg.) Blood Agar / CNA in blood agar (hemolysis patterns, etc.) Also: Catalase Test	Ex. 4-3 MSA, p.217 – 218 Ex. 4-6 Hektoen, p.233-34 Ex. 4-4 MacConkey, p.221-3 Ex.5-21 / 4-2 Blood agar p.213-14 & p. 341-3 Ex. 5-4. p.2 57 - 260	p. 219-02; p. 209-10; p.235-36; (selected quest.) p. 215-16 & p. 345 -46 (selected questions) . 259 - 260

9	LECT. 9	Microbial Genetics Principles of Disease & Epidemiology	Ch. 8, p. 207 - 243 Ch. 14, p. 399 - 427	p. 241-43 and p. 425-7 selected quest.
9	Lab 9	Tests for Detecting Presence of Hydrolytic Enzymes: Starch Hydrolysis Casein Hydrolysis DNA Hydrolysis	Ex. 5-11, p. 293- 295 Ex. 5-13, p. 303 – 304 Ex. 5-15, p. 311 – 312	p. 297-8; p. 305 -6; and p. 313 - 314 , (selected quest.)
10	LECT. 10	Principles of Disease & Epidemiology Microbial Mechanisms of Pathogenicity	Ch. 14, p. 401 – 428 Ch. 15, p. 429 – 450	p. 426-28 and p.449-50 (selected quest.)
10	Lab 10	Fermentation Tests Oxidation-Fermentation Test Phenol Red Glucose Media	Ex. 5-1, pp. 240 -242 Ex. 5-2, pp. 245 -247	p. 243-44 and p.249-50 (selected quest.)
11	LECT. 11	Microbial Mechanisms of Pathogenicity Non-specific Defenses of the Host	Ch. 15, p. 429 -450 Ch. 16, p. 451 - 477	p. 449-50and p. 476 - 77 (selected quest.)
11	Lab 11	Combination Differential Media. SIM Medium Triple Sugar Iron /Kligler Iron Agar	Ex. 5 -18, pp. 323 - 326 Ex. 5 -19, pp. 329 - 331	p. 327 -28 & p. 333 -34 (selected quest.)
12	LECT. 12	Non-specific Defenses of the Host Specific Defenses of the Host	Ch. 16, p. 451 – 477 Ch. 17, p. 478 – 503	p. 476-77 and p. 502-03 (selected quest.)
12	Lab 12	Examination of Eukaryotic Microbes: Algae and Protozoa Surveys	Ex. 3-3, p. 141-45 (col.2), Applic.:p.148-50 (regarding algae & protozoa)	p. 151 – 152 (selected quest.)
13	LECT. 13	Specific Defenses of the Host Antimicrobial Drugs	Ch. 17, p. 478 –503 Ch. 20, 558 - 588	p. 502-03 and p. 587-88 (selected quest.)
13	Lab 13	Antimicrobial Susceptibility Test	Exercise 7-2, p. 397 –400	p. 401 – 402 (selected quest.)
14	LECT. 14	Antimicrobial Drugs continued.		
14	Lab 14	Examination of Eukaryotic Microbes: Fungal Survey	Exercise 3-3, p.145 (col.2) – 148; Applic. P.148-50 (re. fungi)	p. 151 – 152 (selected quest.)
15	LECT. Exam	<u>LECT. Examination - FINAL</u> (cumulative/comprehensive exam)		
15	Lab exam	<u>Lab Exam 4</u>		

Course schedule:

Readings must be completed for each class. Not all assigned texts will be discussed in class or covered in the class lectures. Items tagged with an * and *italics* indicate in class (low stakes) writing assignments. Lecture exam and lab exam dates as well as what material will be covered in each exam will be provided by individual instructors. This syllabus contains information for old edition of textbook (10th ed.) and old edition of lab manual (1st ed. .)

W K	DATE	TOPIC	READ FOR TODAY	ASSIGNMENT (see notes below regarding writing assignments and lab reports, etc.)
1	LECT. 1	Microbial World and You	Ch. 1, p. 1 – 25	p. 23-5 (selected quest.)
1	Lab 1	Introduction Intro. to light microscope Wet mounts (& hanging drop) Prep.	Introduction pp. 1-5 Ex. 3-1, pp. 120 -26 Ex. 3-10, pp. 183-186	p.125-26 and p. 185-86 (selected quest.)
2	LECT. 2	Microbial World and You Chemical Principals	Ch. 1, p. 1 – 25 Ch. 2, p 26 – 53	p. 23-5 and p. 51-3 (selected quest.)
2	Lab 2	Simple Stains	Ex. 3-4, pp. 149-54	p. 153 - 54 (selected quest.)
3	LECT. 3	Chemical Principals Observing Microorganisms Through a Microscope	Ch. 2, p 26 – 53 Ch. 3, p. 54 - 75	p. 51-3 and p. 74-5 (selected quest.)
3	Lab 3	Gram Stain (& relationship to bacterial cell anatomy)	Ex. 3-6, p. 159-66	p. 165 - 66 (selected quest.)
4	LECT. 4	Functional Anatomy of Prokaryotic & Eukaryotic Cells	Ch. 4, p. 76 – 112	p. 110-12 (selected quest.)
4	Lab 4	Acid Fast Stain	Ex. 3-7, pp. 167 - 72	p. 171 -72 (selected questions)
5	LECT. 5	Functional Anatomy of Prokaryotic & Eukaryotic Cells Microbial Metabolism	Ch. 4, p. 76 – 112 Ch. 5, p. 113 – 155	p. 110-12 and p. 153-5 (selected quest.)
5	Lab 5	Endospore stain	Ex. 3-9, pp. 177 – 182	p. 181 - 82 (selected quest.)
6	LECT. 6	Microbial Metabolism Microbial Growth	Ch. 5, p. 113 – 155 Ch. 6, p. 156 – 183	p. 153-5 and p. 181-3 (selected quest.)
6	Lab 6	Negative Stain / Capsule Stain Colony Morphology /Growth Patterns on Slants/Growth Patterns in Broth	Ex. 3-5, p. 155-58 & 3-8, pp. 173-6; Ex. 2-2, p. 55- 64; Ex. 2-3 p. 65-68; Ex. 2-4, p.69-72.	p. 157-8 & p. 175-76 p.63-4; p. 67-8 and p. 71-2 (selected quest.)
7	LECT. 7	Control of Microbial Growth Microbial Genetics	Ch. 7, p. 184 – 209 Ch. 8, p. 210 - 245	p. 207-9 and p. 244-5 (selected quest.)
7	Lab 7	Streak plate method of Isolation (pour plate as a demonstration)	Ex. 1-4,, p. 29 -31	p. 33 – 34 (selected quest.)
8	LECT. 8	Microbial Genetics	Ch. 8, p. 210 - 245	p. 244-5 (selected quest.)
8	Lab 8	Selective Media and Blood Agar Mannitol Salt Agar (MSA), Hektoen & MacConkey (cont. next pg.) Blood Agar / CNA in blood agar	Ex. 4-1 MSA, p.197 – 202 Ex. 4-5 Hektoen, p.217-20 Ex. 4-6 MacConkey, p.221-4 Ex.5-20 / 4-3 Blood agar	p. 201-2; p. 209-10; p.219-20; (selected quest.) p. 209-10 & p. 223 -24

		(hemolysis patterns, etc.)	p.207-10 & p. 321-6	(selected questions)
9	LECT. 9	Microbial Genetics Principles of Disease & Epidemiology	Ch. 8, p. 210 - 245 Ch. 14, p. 399 - 427	p. 244-5 and p. 425-7 selected quest.
9	Lab 9	Tests for Detecting Presence of Hydrolytic Enzymes: Starch Hydrolysis Casein Hydrolysis DNA Hydrolysis	Ex. 5-11, p. 279- 284 Ex. 5-13, p. 289 – 292 Ex. 5-15, p. 297 - 300	p. 283-4; p. 291 -2; and p. 299 - 300 (selected quest.)
10	LECT. 10	Principles of Disease & Epidemiology Microbial Mechanisms of Pathogenicity	Ch. 14, p. 408 – 427 Ch. 15, p. 428 – 448	p. 425-5 and p.447-8 (selected quest.)
10	Lab 10	Fermentation Tests Oxidation-Fermentation Test Phenol Red Glucose Media	Ex. 5-1, pp. 226 -230 Ex. 5-2, pp. 231 -236	p. 229-30 and p.235-36 (selected quest.)
11	LECT. 11	Microbial Mechanisms of Pathogenicity Non-specific Defenses of the Host	Ch. 15, p. 428 -448 Ch. 16, p. 449 - 475	p. 447-8 and p. 474 - 5 (selected quest.)
11	Lab 11	Combination Differential Media. SIM Medium Kligler Iron Agar	Ex. 5 -17, pp. 305 - 310 Ex. 5 -18, pp. 311 - 316	p. 309 -10 & p. 315 -16 (selected quest.)
12	LECT. 12	Non-specific Defenses of the Host Specific Defenses of the Host	Ch. 16, p. 449 – 475 Ch. 17, p. 476 – 499	p. 474-5 and p. 498-499 (selected quest.)
12	Lab 12	Examination of Eukaryotic Microbes: Algae and Protozoa Surveys	Ex. 3-3, p. 131-36 (col.1), p. 139 (Application) – 144 (regarding algae & protozoa)	p. 143 – 144 (selected quest.)
13	LECT. 13	Specific Defenses of the Host Antimicrobial Drugs	Ch. 17, p. 476 –499 Ch. 20, 553 - 583	p. 498-99 and p. 582-3 (selected quest.)
13	Lab 13	Antimicrobial Susceptibility Test	Exercise 7-2, p. 371 –76	p. 375 – 376 (selected quest.)
14	LECT. 14	Antimicrobial Drugs continued.		
14	Lab 14	Examination of Eukaryotic Microbes: Fungal Survey	Exercise 3-3, p.136 (col.2) – 139 (Application) – 142 regarding fungi	p. 143 – 144 (selected quest.)
15	LECT. Exam	<u>LECT. Examination - FINAL</u> (cumulative/comprehensive exam)		
15	Lab exam	<u>Lab Exam 4</u>		