

NORTH SHORE COMMUNITY COLLEGE  
DANVERS, MASSACHUSETTS

COURSE OUTLINE  
Summer 2012

**COURSE:** *BIO 110 BDX, INTRODUCTION TO MICROBIOLOGY*

**INSTRUCTOR:** *Professor Noel Ways*

**TEXT:** *Microbiology, An Introduction by Tortora, Funke, and Case, 10th edition, Benjamin/Cummings Publishing Co., Inc., © 2012*

**LAB MANUAL:** *Microbiology, A Laboratory Manual 9th edition, by James G. Cappuccino and Natalie Sherman; The Benjamin/Cummings Publishing Company, Inc., © 2012*

**ADDITIONAL SUPPLIES:** *Recorder, Safety Glasses or Goggles, Colored Pencils, Markers*

**LOCATION AND TIME:** *Lecture: Danvers/DH306 Tues & Thurs 10:30 -12:35  
Lab: Danvers /H215 Wed 10:30 -1:15*

COLLEGE COURSE DESCRIPTION:

*Pre: BIO101 or 103, or BIO124 or CHE101, or 103, or 114*

*A study of viruses, bacteria, protozoans, and the lower fungi with special emphasis on their environmental and medical implications. The course considers the characteristics, ecology, control and impact on humans. The laboratory concentrates on the development of aseptic techniques and the culturing, enumerating, and identification of microorganisms. Fulfills open and liberal arts electives. (3 hours of lecture, 2 hours of lab per week)*

*Microbiology explores the science of microorganisms, particularly as they have relevance to students pursuing careers in the allied health fields. The course will naturally place great emphasis on bacteria and viruses, but beyond that, macroscopic parasitic organisms will be discussed due to their pathogenic effects, and as they are typically hidden from view at certain stages of their development.*

*The course will commence with an introduction to the history of microbiology and fundamental terms. This will be followed by a look at the disease producing capabilities of pathogenic microorganisms, as well as characteristics used for classification purposes. A brief discussion regarding bacterial genetics, and metabolism will follow. Lastly, specific organisms that cause specific types of disease will be discussed. Other subjects of particular relevance will be discussed at appropriate points in the lecture sequence.*

*The laboratory is designed to give the students a “hands on” appreciation for microorganisms and to familiarize the student with some of the more basic microbiological procedures employed by professional microbiologists. The laboratory period will also be used for lecture purposes.*

**TEACHING PROCEDURES:**

*The lecture sequence will be presented in a systematic fashion with accompanying overheads to facilitate organization and understanding of the lecture material. Students will have in possession outlines of all lectures as well as handouts to facilitate and illustrate understanding to concepts. All outlines and handouts are accessed through the web.*

*The laboratory is designed to give the students a “hands on” appreciation for the Microbiological considerations being discussed in lecture and to familiarize the student with some of the more common organisms considered during lecture. The laboratory period will also be used for lecture purposes.*

**COURSE OBJECTIVES:**

*As students of the allied health professions, there is a foundational base of knowledge that is required in order to become responsible and professional in your field of study. In order to reach these goals, the student may anticipate meeting the following objectives upon completion of the course:*

- 1. An appreciation for the normal bacterial flora of the human body*
- 2. The nature and pathogenicity of major groups of microorganisms, including, but not limited to:*
  - a. Pathogens of the Respiratory System*
  - b. Pathogens of the Digestive System*
  - c. Pathogens of the Urogenital System*
  - d. Pathogens of the Integumentary System*
- 3. Fundamentals of Parasitology*

4. *An understanding of the role of the microbiologist in the medical arena, as well as an appreciation for the ever-present existence of microorganisms.*
5. *The nature and relevance of chemotherapy in fighting pathogenic microorganisms.*
6. *The nutritional requirements and metabolism of microorganisms.*
7. *Major historical figures and events in the development of microbiology as a science.*
8. *The methods and importance of microbial control and asepsis.*

### GRADING POLICY

*The assignment of a final semester grade will be dependent upon the completion of 8 mandatory lecture exams, of which the lowest grade may be dropped (exception is the last exam, which can not be dropped). These exams will cover material in both the lecture as well as the lab. The nature of the exams is non-comprehensive and will cover material from the previous exam. No grade will be given unless all exams are taken.*

*The lecture exams are also used to evaluate the laboratory component of the course. Specific questions drawn from the laboratory text and your experience in the lab will be present on the lecture exams.*

*Eight Lecture Exams = 800 points*  
*(Drop lowest grade) = 700 points*

*The assignment of grades is based upon an absolute scale, see chart below. Makeup exams do not exist! If you miss an exam, that will be the exam you drop. If you miss two exams, one you will drop, the other will be a 0. The student is strongly encouraged to take all exams.*

### Grading Policy:

A	4.0	93-100	B-	2.7	80-82	D+	1.3	67-69
A-	3.7	90-92	C+	2.3	77-79	D	1.0	60-66
B+	3.3	87-89	C	2.0	73-76	F	0.0	0-59
B	3.0	83-86	C-	1.7	70-72			

## NOTES

- **Students with Learning Disabilities** - North Shore Community College welcomes students with disabilities to engage in an interactive, collaborative partnership with Disability Services and faculty in order to meet your educational and academic needs. If you have a disability-related need for reasonable academic accommodations in this course and have not yet met with a Disability Counselor, please visit [www.northshore.edu/disability](http://www.northshore.edu/disability) and follow the outlined procedure to request services. If Disability Services has formally approved you for an academic accommodation in this class, please present me with your "Faculty Notice of Academic Accommodations" during the first week of the semester, so that we can address your specific needs as early as possible. If you will require assistance during an emergency evacuation on campus, please notify me immediately. For your reference, evacuation procedures are posted in all classrooms.
- **The Syllabus** Please keep a copy of this syllabus as a record of course content for future application purposes.
- **Recording of Lectures** Recording of the lectures is always permitted. The use of lap-top computers or word processors is encouraged if it helps the student integrate the material. Feel free to use a digital camera to photograph laboratory dissections, models, or any other supportive tool. You may videotape the lecture if you like. In short, you may do anything you deem necessary to master the subject matter as long as it is legal, ethical, and non-disruptive.
- **Attendance** of every lecture and every lab is strongly encouraged, as material will be presented that may not be otherwise covered in the text.
- **Tardiness** Please be on time. Tardiness is disruptive to both the students and the instructor. If you are late, please make sure that you are marked down on the attendance sheet before you leave.
- **Cellular Phones** Unless you anticipate an emergency call, please turn your phones off.
- **Alternative Textbook** If the student chooses to use an alternative textbook, or an edition other than the one required for this course, it is the responsibility of the student to obtain information that is either not covered or otherwise not approached in similar manner as in the required text, as deemed necessary by the student.
- **Textbook Usage** The role of the textbook is to be a supportive tool to the lectures. The student is not expected to memorize the entire textbook, but to use it to reinforce concepts and material presented during lecture.
- **Web Site** The web site associated for this course can be found by doing a search on you browser for your instructor's name, or typing in the following

address: <http://faculty.necc.mass.edu/nways/index.html>

Once the site is accessed, select your course and there you will find your lecture outlines, handouts, and other support material. There is also an email button for correspondence with your instructor.

- **Lecture Outlines and Supplemental Materials** are to be found on the internet. Should you have difficulty downloading any of the material at home, then you are encouraged to do this task at the school. All materials should be downloaded and organized in a three ring binder by the third week of classes.
- **Computer Lab Access** may require a current student ID.
- **The Schedule** below is a tentative but probable schedule of topics and dates. The schedule will be modified according to the progress of the lectures. The exam dates are target dates and will represent only material actually covered in class. Specifics regarding content will be given as the exam date approaches.
- **Exam Dates** Please note exam dates on the schedule below.
- **Exam Filing** All exams are returned to the instructor and filed after being handed back for review.
- **Make-up Exams** are to be avoided! If a make-up exam is needed, fill out a make-up petition form (found on web) and provide requested documentation. If a doctor's note is submitted, then a make-up exam is permitted. If a doctor's note is not submitted, a penalty is applied at the discretion of the instructor, and the instructor reserves the right to refuse the make-up. If there is to be a make-up, this task must be accomplished as soon as the student returns to school in good health, and within 5 school days. Lab practicals are very difficult to make up. Generally, if you miss a lab practical, this will be the exam grade you drop. If you miss a prelab quiz, this is not made up.
- **Laboratory Quizzes** - Prelab quizzed may be given before a lab commences. If you miss a prelab quiz, this is not made up. Lecture exams will have postlab questions regarding the past few labs.
- **Exam Grades** are not given over the internet.
- **Tutoring** The college provides free tutoring services during Fall and Spring semesters. Contact the academic support center for the days and times. Tutoring is a free service of the college and designed to assist students who desire to excel in their mastery of the material as well as those struggling.
- **Identification** of all texts, recorders, and lab manuals is important. Please put your name and phone number on all personal belongings. If you leave something behind, you may be contacted as to where to pick it up.
- **Unscheduled School Cancellations** Should class be cancelled, the student is expected to master the material that is scheduled for that day on the

downloadable outline. Should additional instructions be necessary, they can be found on the web site, under “announcements”. During the subsequent class period, some topics may be reviewed, but responsibility for mastery of the material is upon the student.

- **Contact Information** See email address for contact link. When emailing, always identify yourself and the class that you are in. Always have the subject line appropriately filled in. I will not open mail that is not properly identified.
- **Recommendations** Should you seek a letter of recommendation to future programs, please provide the instructor with appropriate information and deadlines that you are facing and a stamped and addressed envelope. Finally, to assure that your application is complete, please contact the school after a reasonable period of time to assure their having received the letter. Contact me if there are any problems.

### Laboratory

- If you have a known respiratory condition, are immuno-compromised, or are pregnant, a written note from your primary care physician is required in order to participate in lab. If you or your doctor / primary care provider have any questions, please contact me through NSCC. Present to your primary care physician the list of organisms, chemicals, antibiotics, and media found on page 10 of this syllabus for his / her review. With their permission you may participate in the laboratory exercises. See me if you have any questions.
- **Clothing in Lab** Students are advised to never wear valuable clothing to lab as laboratory procedures may result in permanent damage to clothing.
- **Safety Eyewear** must be used during dissection exercises. Acceptable eyewear must have a rating of “Z87.1”.
- **Eating** during laboratory time is prohibited.
- **Children** Due to safety concerns, children are never permitted in the lab.

### Summer 2012 SCHEDULE

<u>Day</u>	<u>LECTURE</u>
May 22	Introduction to Microbiology and the Cell
May 24	Essential Chemistry for Microbiology
May 29	Microbial Growth and Nutrition Bacterial Genetics
May 31	Biotechnology

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June 5                      *Unusual Prokaryotes, Viruses*

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June 7                      *Eukaryotic Microorganisms*

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June 12                     *Control and Asepsis*

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June 14                     *Chemotherapy and Antibiotics*

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June 19                     *Nonspecific Host Resistance*

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June 21                     *Specific Host Resistance*

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June 26                     *Vaccines, Antisera, and Immune Applications*

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June 28                     *Vector Borne Disease*  
*(and, Pathogens of Cardiovascular and Lymphatic System)*

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July 1-7                     *No Class - Summer Break*

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July 10                      *Vector Borne Disease*  
*(and, Pathogens of Cardiovascular and Lymphatic System)*

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July 12                      *Pathogens and the Respiratory Tract*

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July 17                      *Pathogens and the Digestive Tract*

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July 19                      *Pathogens and the Digestive Tract*  
*(and, Pathogens of the Nervous System)*

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July 24                      *Pathogens of the Genitourinary Tract*

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July 26                      *Pathogens via the Skin*

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July 31                      *HIV/AIDS*

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August 2                    **{FINAL EXAM}**

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# Exam Grade and Content Sheet

Exam #1: \_\_\_\_\_

Introduction and the cell  
Essential Chemistry for Microbiology

Exam #2: \_\_\_\_\_

Microbial Growth and Nutrition  
Bacterial Genetics

Exam #3: \_\_\_\_\_

Biotechnology  
Unusual Prokaryotes, Viruses  
Eukaryotic Microorganisms

Exam #4: \_\_\_\_\_

Control and Asepsis  
Chemotherapy and Antibiotics

Exam #5: \_\_\_\_\_

Nonspecific Host Resistance  
Specific Host Resistance  
Vaccines and Antisera

Exam #6: \_\_\_\_\_

Antisera, Vaccines, and Immune Applications  
Vector Borne Disease

Exam #7: \_\_\_\_\_

Pathogens and the Respiratory Tract

Exam #8: \_\_\_\_\_

Pathogens and the Digestive Tract

Exam #9: \_\_\_\_\_

Pathogens of the Genitourinary Tract  
Pathogens via the Skin

Calculation of your grade is simple. Drop your lowest grade, then do a simple average. This is your course grade to date. Note your grade in the numeric/letter equivalence chart below.

*Grading Policy:*

A	4.0	93-100	C	2.0	73-76
A-	3.7	90-92	C-	1.7	70-72
B+	3.3	87-89	D+	1.3	67-69
B	3.0	83-86	D	1.0	60-66
B-	2.7	80-82	F	0.0	0-59
C+	2.3	77-79			



## Laboratory Sequence, Tentative

### Laboratory #1 (May 23)

- Safety
- Microscopy (exercise #4)
- Preparation of Bacterial Smears (exercise #7)
- Gram Stain (exercise #10)

### Laboratory #2 (May 30)

- Acid Fast Staining (exercise #11)
- Living Bacterial Preparations (exercise #5)
- Spore Stain (exercise #12, part A)

### Laboratory #3 (June 6) -- BRING DISSECTION KITS TO LAB !!!!!

- Free Living Protozoa (exercise #33)
- Parasite Dissection (Print lab from WEB site)

### Laboratory #4 (June 13)

- Physical Agents of Control (exercise #42)
- Chemical Agents of Control (exercise #43)

### Laboratory #5 (June 20)

- Culture Transfer Techniques (exercise #1)
- Pure Culture Isolation (exercise #2)

### Laboratory #6 (June 27)

- Physical Factors: Oxygen Requirements (exercise #17)
- Anaerobic Microorganisms (exercise #18)

### No Laboratory (July 4) - Summer Break

### Laboratory #7 (July 11)

- Microbiological Analysis of Food Products (exercise #46)

### Laboratory #8 (July 18)

- Enzymatic Activities of Microorganisms (exercise #21)
- Carbohydrate Fermentation (exercise #22)

### Laboratory #9 (July 25)

- Check results for Lab #8, no prep.
- ELISA
- Enterotube

Laboratory #10 (August 1) - No Lab, lecture - maybe.

Below is a list of microorganisms and chemicals to be used in laboratory this semester. If you have a known respiratory condition, are immuno-compromised, or are pregnant, a written note from your primary care physician is required in order to participate in lab. If you or your doctor / primary care provider have any questions, please contact me through NSCC.

Organisms

<i>Alcaligenes faecalis</i>	<i>Enterococcus faecalis</i>
<i>Aspergillus niger</i>	<i>Micrococcus luteus</i>
<i>Bacillus cereus</i>	<i>Saccharomyces cerevisiae</i>
<i>Clostridium sporogenes</i>	<i>Serratia marcescens</i>
<i>Corynebacterium xerosis</i>	<i>Staphylococcus epidermidis</i>
<i>Escherichia coli</i>	

Chemicals

Gram's Iodine	Methylene blue
Safranin	Malachite green
Carbol Fuchsin	Safranin
Acid-alcohol	95% ethanol

Antibiotics

Penicillin-G, 10 $\mu$ g	Vancomycin, 30 $\mu$ g
Streptomycin, 10 $\mu$ g	Sulfanilamide, 300 $\mu$ g
Tetracycline, 30 $\mu$ g	Trimethoprim, 5 mg
Chloramphenicol, 30 $\mu$ g	Sulvisoxazole, 150 mg
Gentamicin, 10 $\mu$ g	

Media

Mueller-Hinton Agar Plates	EMB Agar
Nutrient Agar	Starch Agar
Nutrient Broth	Tributylin Agar
Trypticase Soy Agar Plates	Phenol Red Lactose Broth
Sabouraud Broth	Phenol Red Dextrose Broth
Thioglycollate Broth	Phenol Red Sucrose Broth
Brain-Heart Infusion Agar	
Milk Agar Plates	
Nutrient Gelatin	

## Exam Taking Rules

Here is a set of Rules regarding taking exams:

### *Things you may NOT do:*

- Look at another students exam
- Go to the bathroom
- Have any electronic devices in hand/lap or in operation
- Nothing may be on desk - water bottles, papers, hats ETC.
- Cheat ( Dah !! )

### *Things you may do:*

- Put down the correct answers
- Hold it, until the exam is over.
- Look at your own exam
- Look at me (I'll smile)

### *What if you:*

- Look at another students exam: Exam is dropped / 0
- Go to the bathroom during exam: Exam is dropped / 0
- Have electronic devices in hand/lap (even if they are off):  
Exam is dropped / 0
- Have on desk water bottles, papers, hats ETC: Exam is dropped / 0
- Cheat: Exam is dropped / 0

Exams are “open brain” not “open book”: STUDY HARD !!!

Students who study hard and know the material well, often enjoy the exams - a reward and cc of hard work, and a job well done.