

**BIO366: Molecular Microbiology Laboratory**  
**Fall-2018**  
**Undergraduate Biology**  
**State University of New York at Stony Brook**

**Course Director: Dr. Sangeet Honey**

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Office Hours: By appointment only;

**Laboratory Teaching Assistants: TBA**

## **COURSE DESCRIPTION:**

This course will include both lectures as well laboratory sessions focused on conventional and contemporary Molecular Microbiological techniques. The lectures will cover a variety of microorganisms; Bacteria, Fungi, Viruses, and Protozoans based on textbook readings and current research articles. In the laboratory, students will learn fundamental and applied microbiological methods, biochemical and DNA profiling of microorganisms, and the molecular basis of physiological processes used for the identification of unknown bacteria. This course will serve as an upper-division elective for BIO majors. The course has an associated fee. Please see [www.stonybrook.edu/coursefees](http://www.stonybrook.edu/coursefees) for more information.

### **Course Pre/co-requisites**

BIO 202; BIO 205 or 207; BIO 315 with a grade of C or better

## **COURSE OBJECTIVES:**

**Upon successful completion of this course students should be able to:**

1. Apply appropriate terminology relating to the structure and genetics of prokaryotic microorganisms, eukaryotic microorganisms, and viruses.
2. Demonstrate fundamental Microbiology laboratory skills and techniques related to the proficient use of microscope, inoculation and aseptic transfer of bacteria, isolation of pure cultures, and staining to identify bacterial morphology, arrangement, and Gram reaction.
3. Differentiate and identify Gram-positive *Cocci* and *Enterobacteriaceae* based on biochemical and molecular profiling.
4. Explain the molecular basis of physiological processes used for the identification of unknown bacteria.
5. Understand the concept of opportunistic and pathogenic microorganisms and their interactions with susceptible hosts.
6. Demonstrate physical and chemical methods used in the control of microorganisms.
7. Acquire knowledge of phage typing technique useful in tracing the source of outbreaks of infections.
8. Develop capability to handle potentially pathogenic microorganisms and work both independently and with others in the laboratory.
9. Make personal health decisions in regard to infectious diseases.

## **COURSE REQUIREMENTS:**

### **Attendance and Make Up Policy**

Students are expected to attend all lectures as well laboratory sessions. A student who misses more than one unexcused laboratory session during the first two weeks of the semester will be dropped from the course. Missing more than two unexcused lecture or laboratory sessions after the first two weeks can lead to removal from the class roster. Attendance at all exams is mandatory. Students who are absent due to University-sanctioned religious holiday(s) should notify the course Director in writing preferably at the beginning of the semester, but no later than two weeks prior to any affected class session. In case of participation in University-sponsored official events (for documented student athletes only), excuse must be documented on official letterhead (as appropriate). In the event of medical emergency (personal illness or in the immediate family), verification will be accepted from a physician writing on official letterhead or prescription pad. Laboratory practical cannot be made up. Students are strongly encouraged to turn in the laboratory reports on or before the due dates otherwise a grade of zero will be calculated for missing

reports unless a valid documented proof is submitted explaining the serious circumstances beyond student's control. In any of the abovementioned scenarios, it is the student's responsibility to obtain any class notes or other course material/information missed due to the absence from peers in the course. It is also the student's responsibility to speak with the course Director to make arrangements for missed examinations or graded assignments.

**Description and schedule of Required Readings and/or Assignments.**

**Textbook:** Foundations in Microbiology by Talaro and Chess  
 Publisher: McGraw-Hill Science/Engineering/Math; 10<sup>th</sup> edition.

**Laboratory manual:** Laboratory Applications in Microbiology: A case study approach by Barry Chess  
 Publisher: McGraw-Hill Science/Engineering/Math; 3rd edition.

There will be a four-hour laboratory session (Recitation: R01 and hands-on work: L01) per week. All students will meet for an additional two hours of lecture per week.

Lecture: Monday 10:00 am to 11:50 am (SOCBEHAV SCI S218, West Campus)

Laboratory: Tuesday 9:00 am to 12:50 pm (MDL room 2-161, 2<sup>nd</sup> floor, HSC)

**Weekly laboratory schedule:**

<b><u>WEEK (Date)</u></b>	<b><u>LABORATORY EXERCISE(S)</u></b>
<b>Week 1 (8/28)</b>	Ex # 1, 2, 6
<b>Week 2 (9/4)</b>	Ex # 7, 41, 44, 56, 8
<b>Week 3 (9/11)</b>	<b>Quiz # 1</b> , Ex # 8, 9, 10, 11
<b>Week 4 (9/18)</b>	<b>Quiz # 2</b> , TAs will meet with students in a classroom – Room 038, LSB.
<b>Week 5 (9/25)</b>	Ex # 63, 75, 78, 79, 80, 81
<b>Week 6 (10/2)</b>	Ex # 49, 52, 57, 59, 65, 70, 77
<b>Week 7 (10/9)</b>	<b>No Classes in session (Fall break)</b>
<b>Week 8 (10/16)</b>	<b>Quiz # 3</b> , Ex # 33, 48, 55, 66, 68, 69, 74
<b>Week 9 (10/23)</b>	Read the results from the previous week's lab <b>Review for "Lab exam-1 and Lab practical"</b> Ex # 4
<b>Week 10 (10/30)</b>	<b>Lab Exam-I (written test) 9:00 am to 10:45 am</b> <b>Lab Practical (Identification of Unknowns) part-1 (11:00 am to 12:50 pm)</b>
<b>Week 11 (11/6)</b>	<b>Lab practical (Continuation of Unknowns) part-2</b>
<b>Week 12 (11/13)</b>	<b>Lab practical (Conclusions of Unknowns) part-3</b> , Ex # 24, 26
<b>Week 13 (11/20)</b>	<b>TAs will meet with students in a classroom – Room 038, LSB.</b> <b>Quiz # 4</b> <b>Write-ups due.</b> <b>Deadline for submission of the undergraduate writing requirements form.</b>

<b>Week 14 (11/27)</b>	Ex # 17, 18, 20, 86
<b>Week 15 (12/4)</b>	<b>Quiz # 5</b> , Ex # 5, Handouts
<b>Week 16 (12/11)</b>	<b>Lab Exam-II (Written test)</b>

**Weekly lecture schedule:**

<b>WEEK (Date)</b>	<b>LECTURE</b>
<b>Week 1(8/27)</b>	Introduction and Main Themes of Microbiology (A brief history of Microbiology)
<b>Week 2(9/3)</b>	No Classes in session
<b>Week 3(9/10)</b>	Prokaryotic Cell Structures and Functions (Cell wall, capsule, endospores)
<b>Week 4(9/17)</b>	Gram-Positive and Gram-Negative Cocci and Bacilli
<b>Week 5(9/24)</b>	Miscellaneous Bacterial Agents of Disease
<b>Week 6(10/1)</b>	Controlling Microbial Growth in the Body: Antimicrobial drugs
<b>Week 7(10/8)</b>	No classes in session (Fall break)
<b>Week 8(10/15)</b>	<b>Midterm</b>
<b>Week 9(10/22)</b>	Viruses Part-1 (DNA viruses)
<b>Week10(10/29)</b>	Viruses Part-2 (RNA viruses)
<b>Week 11(11/5)</b>	Microbe-Human Interactions, Infections, and Infectious Diseases
<b>Week 12(11/12)</b>	Diagnosing Infections: Phenotypic and Genotypic methods
<b>Week 13(11/19)</b>	Fungi Part-1
<b>Week 14(11/26)</b>	Fungi part-2
<b>Week 15(12/3)</b>	Protozoans
<b>Week 16(12/10)</b>	<b>Review</b>
<b>Week 16(12/14)</b>	<b>Final Exam (Cumulative)</b>

**Exams**

There will be two lecture exams; Midterm and Final exam.

Midterm exam will be based on the topics covered in lecture class weeks 1 through 7.

The final Exam will be a cumulative written exam covering all the information presented in the lecture class and it will be designed to take up to 2 hours.

Laboratory performance will be evaluated based on;

Weekly post-lab quizzes;

Two written exams (Lab Exam-I and II);

Lab practical (Identification of Unknowns) and

Write-ups (Scientific paper based on the results from Unknowns identification)

Post-lab quizzes will be based on previous weeks' laboratory recitations and corresponding lab exercise(s) described in the laboratory manual. Each lab quiz will consist of about 10 (multiple-choice and/or short-answer) questions. Missed quiz(s) will not be dropped and will result in a grade of zero.

The details of laboratory practical will be discussed during a laboratory session about a couple of weeks before the practical exam.

Written exams will usually consist of about 40 multiple-choice, fill-in-the blank, matching, and/or short answer questions.

If classes are cancelled for some reason on the day of an exam, the exam will be re-scheduled for the next class meeting unless otherwise announced.

### **Tentative Examination da**

October 15, 2018 :	Midterm (lecture) 10:00 am to 11:30 am
October 30, 2018 :	Lab exam-I (written 9:00 am to 11:00 am); Lab practical part-1
November 6, 2018	Lab practical part-2
November 13, 2018:	Lab practical part-3
November 20, 2018:	Write-ups due.
	Last date for submission of the undergraduate writing requirements form
December 11, 2018:	Lab exam-II (Written) 9:30 am to 11:30 am
December 14, 2018:	Final exam (11:15 am to 1:15 pm)

### **GRADING:**

**The final percentage grade will be calculated based on the following components:**

Lecture: (40%)

Midterm exam	15%
Cumulative Final exam	25%

Laboratory: (60%)

Lab quizzes	15%
Lab exam-I	15%
Lab practical	10%
Lab exam-II	15%
Lab attendance and participation	5%

**Following grading schema will be used to determine the Final Letter Grade for the course:**

<b><u>Grades Scored Between</u></b>	<b><u>Will Equal</u></b>
94% and 100%	A
90% and Less Than 94%	A-
87% and Less Than 90%	B+
83% and Less Than 87%	B
80% and Less Than 83%	B-
77% and Less Than 80%	C+
74% and Less Than 77%	C
71% and Less Than 74%	C-
65% and Less Than 71%	D+
60% and Less Than 65%	D
0% and Less Than 60%	F

## **CLASS PROTOCOL**

Use of electronic devices such as cell phones and laptops is not permitted in the class (lecture or laboratory). Safety practices explained by the laboratory instructor and posted on the Blackboard must be followed by all the students. Failure to comply with the safe laboratory practices, after two warnings, may lead to dismissal from the class. ABSOLUTELY NO eating or drinking in the laboratory.

## **CLASS RESOURCES**

Blackboard will be used for class management and posting the grades.

## **DISABILITY SUPPORT SERVICES (DSS) STATEMENT:**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

<http://www.stonybrook.edu/ehs/fire/disabilities>

## **ACADEMIC INTEGRITY STATEMENT:**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

## **CRITICAL INCIDENT MANAGEMENT:**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.