

SYLLABUS

Microbiology Laboratory (MCB3023L, Section 13354) (Web-Enhanced Course)

"Nobody is born intelligent: intelligence feeds from strong effort and a desire to learn"
-Anonymous

Term: Fall 2016-1

Class location: Room A202

Class Meeting time: Tuesday, 5:40PM – 9:00PM

Professor: Dr. Félix E. Rivera-Mariani

Office: Room A202, 1221

Office Hours: Tuesday (A202) or Thursday (1221): 3:00PM – 5:00PM or by appointment

Email: friveram@mdc.edu

Phone: TBA

Required Textbook (print or e-book): Leboffe, M.J. and B. E. Pierce. 2015. Microbiology Laboratory Theory & Applications. 4th Ed. Morton Publishing Company, Inc. Englewood, CO. (ISBN 978-0-86582-830-9).

Co-requisite: Microbiology (MCB2010)

I. Rational of the course

To provide a hands-on learning experience of the different approaches used in the laboratory to study, enumerate, and classify microorganisms.

II. Learning Objectives: *By the end of this course, you should be able to:*

1. Implement correct nomenclature and writing of scientific names
2. Discriminate between the functions of the different parts of a compound microscope
3. Carry out staining protocols to study morphological properties of bacteria
4. Classify microorganisms using microscopy and staining techniques
5. Implement proper aseptic techniques to avoid and limit cross contamination
6. Carry out pure culture techniques to isolate bacteria from mixed cultures
7. Perform and interpret biochemical tests to identify bacteria
8. Design/carry out experiments to evaluate the effects of physical forces on bacterial growth
9. Design/carry out experiments to evaluate the effects of chemicals on bacterial growth
10. Carry out serial dilutions and plating techniques to enumerate bacteria
11. Carry out pipetting techniques in qualitative and quantitative experiments
12. Analyze and interpret data (i.e. series of results) gathered from lab experiments
13. Infer from immunological results to identify bacteria and determine ABO blood types

III. Course Materials (Web-Enhanced Course)

- A. Syllabus, Professor's credentials, Pre-Lab reading assignments, Lab Reports, and Supplemental materials will be available at mdc.blackboard.com.
- B. Required Materials (each student must have their own)
1. Bound notebook
 2. Sharpie fine-tip pen
 3. 10 cm ruler
 4. Long sleeve Lab coat
 5. Safety goggles (if you use contact lenses)
 6. Latex/nitrile gloves
 7. Masking tape
 8. Combination (no key lock) for the hall lockers
 9. Download and install **Reef-Polling™**, and bookmark <https://app.reef-education.com/#/login> into your smartphone. Instructions will be provided in class and in Blackboard Learn on how to create an account into **Reef-Polling™**
- C. Important note about course materials
1. *Always* bring your lab coat: won't be able to allow you in lab without it
 2. *Always* bring your lab notebook to annotate protocols and record results
 3. *Always* label everything with your initials, date, section, lab experiment info
 4. *Always* have gloves available
 5. *Must* store all belongings in the hall locker (no bags allow in lab)
 6. *Always* have your textbook available in lab

IV. Methods of Instructions

- A. ***Pre-Reading assignments:*** through a series of online questions to be completed in Blackboard, you will always start learning a new topic (e.g. terminology, protocols, interpretation of results) outside of the classroom. Each week, a lab section in the Lab Textbook will be assigned, and these online questions are to be completed by **5:40PM on Monday**. These questions will also help you to **1) read with a purpose** (preparing you for class), and **2) engage you in spaced practice** of your learning (you may forget a bit of information, but will learn better because there will be more effort when retrieving the information in class). ***These reading assignments count for a grade (see Grading Scales).***
- B. ***Laboratory Exercises and Experiments*** will be performed during each lab meeting, and the corresponding **lab report(s)** (available at <http://mdc.blackboard.com>) must be completed and submitted online through Blackboard. The corresponding deadlines are posted on the tentative schedule of the syllabus (deadlines may vary with prior notification of the professor). Results and data from a corresponding lab experiments must be collected prior to our next lab meeting. Make arrangements to collect and document the results accordingly to avoid falling behind. In addition, each student **must have a notebook to bound notebook to document 1) pre-document protocols, 2) annotate modifications to protocols perform in the lab, and 3) document results from lab exercises and experiments.**

- C. ***In-class discussion*** of the topics, images, and data (i.e. results from experiments) related to the corresponding topics we discuss in the lab. Rather than having long lectures, active in-class discussions will be implemented to expand our learning, clarify misconceptions, and master interpreting experimental data.
- D. ***Group work*** will facilitate the discussion and peer-teaching of laboratory methods, the design and carrying out lab experiments, and interpretation of results and data obtained our laboratory exercises and experiments. You'll find out the importance of peer-teaching in the classroom.
- E. ***Student Responses Systems*** ("clicker"), through the **Reef-Polling™** application, will help discussion in the lab when questions, data from experiments, are illustrations presented in class. In addition, it will aid us in sharing timely feedback in-class. Through the **Reef-Polling™** application in your smartphone, you will be able to answer instantaneously and remotely.
- F. ***Video feedback*** will be an integral part to learn techniques in the lab. In some instances, and with the aid of your classmates, you will record yourself with a smartphone the techniques you performed in the lab. This approach will aid in interaction within the lab, and facilitate providing feedback to improve your technical skills.

V. Academic Integrity

A. Each student is expected to maintain a high level of integrity and abide by the procedure 4035 of the Miami-Dade College Student Rights and Responsibility Handbook. Any work submitted by a student in the course for academic credit will be the student's own work. For the purpose of this course, collaboration is allowed in the following instances: in-class group work, case studies discussions, or when stated by the professor. Nevertheless, each student must submit their individual work unless stated otherwise by the instructor. Avoid at all costs copying and pasting information from your classmates' response or from any other sources.

As part of a collaborative and encouraging classroom, you are encouraged to study together and to discuss topics and concepts covered in class with other students. You can obtain "consulting" help from students as well as provide "consulting" help to other students. However, this allowed form of cooperation should never involve one student having possession of a copy of all or part of the work done by another student or someone else, in the form digital files or hard copy documents.

In the case that copying occur, both the student who copied work from another student and the student who contributed to this behavior will both automatically receive a zero for the corresponding assignment. The penalty for violation of this Code can include failure of the course and/or notifying the corresponding University authorities for disciplinary action.

During exams (i.e. quizzes and exams), you must do your own work. Talking or discussions are not allowed during the examinations. In addition, you cannot compare papers, copy from others, or collaborate in any way. Any form of the behaviors mentioned above will result in failure of the exam and can include notifying the corresponding University authorities for disciplinary action. **Cell phones cannot leave the classroom during exams, and must be turned off during class unless needed for our in-class discussions.**

Any form of Academic Dishonesty listed in the Miami-Dade College Student Rights and Responsibility Handbook will not be accepted during in the course.

VI. Attendance

A. Attendance at each class sessions parallels with your learning in the course. The Microbiology Lab course requires time and effort in order to learn and be proficient in the learning objectives stated earlier in the syllabus. In addition, **20 easy points for good attendance will provided towards your final grade. For each unexcused absence, unfortunately there will be 1-point deduction.** In the event of an absence, the student will be allowed to make up work if the absence results from one of the following:

1. Official campus activities (as designated by MDC)
2. Family or personal emergencies (as designated by MDC)
3. Medical reasons (discussed with the instructor)
4. Work-related reasons (discuss with the instructor)

B. Three unexcused absences

1. Unfortunately, with three unexcused absences I won't be able to keep you in the class roster.

C. Attendance, Exams, and Quizzes

1. **Make-up exams are allowed only** if your excuse meets any of the four requirements above.
2. **Prior authorization** is required to make-up the exam, and it must be make-up during the week of the exam.
3. **Make-up for quizzes are not allowed.**

D. Laboratory Make-ups:

1. case you miss a lab meeting, the student **can only make up the lab** during the week of the absence by attending another MCB2010L section. In order to be allowed to make up the lab, the student must request a written permission from the professor (Dr. Rivera-Mariani) to make-up the lab in another session. **There are no exceptions.**

VII. Late policy

Unless arrangement have been made prior to the due date or have a valid absence excuse (as stated in the Attendance section of this syllabus), I won't be able to award full grade on Lab Reports and any other assignment submitted late (**the final grade for any late assignment will be 30% less**).

VIII. Accommodations for students with disabilities

In compliance with the Miami-Dade College and the Student Rights and Responsibility Handbook policy and equal access laws, I more than available to discuss any necessary academic accommodations that may be required for the student with disabilities. Requests for academic accommodations are to be made during the first week of the term, except for unusual circumstances, so arrangements can be made. Students are encouraged to contact the Student Services to verify their eligibility for appropriate accommodations.

IX. Inclusivity Statement

Members (student, faculty, administrators) of the Miami-Dade College community represent a diversity of backgrounds and perspectives. In this course, and as a member of this community, I am a strong supporter of diversity and its benefits. Therefore, to maintain an adequate learning and diverse environment students in this course are strongly encouraged to:

- A. share their unique beliefs, experiences, and values
- B. be open to the opinions and views of others
- C. honor your colleagues' uniqueness
- D. appreciate the unique opportunity we have to learn from each other
- E. value each other's opinions and communicate in a respectful manner
- F. keep confidential discussions of personal and professional nature
- G. take advantage of this opportunity to share ways in an inclusive environment
- H. must maintain at all times a respectful environment

X. Grading Scales:

Item	Points
Attendance	20
Pre-Lab Reading Assignments	30
Lab Notebook	100
Quizzes	100
Lab Skill Evaluations	100
Midterm Exam/Practicum	100
Final Exam/Practicum	100
Total points	550

Reef-Polling™ questions = bonus

Grade	Percentage	Points
A	100 – 90.0%	495
B	89.9 – 80.0%	440
C	79.9 – 70.0%	385
D	69.9 – 60.0%	330
F	Below 60.0%	Below 330

- A. Lab Notebook (100):** As mentioned earlier in the syllabus, each student must have a bound notebook to document 1) pre-lab protocols, 2) annotate modifications to protocols perform in the lab, and 3) document results from lab exercises and experiments. The guidelines for annotating in the lab report are found in Blackboard Learn under the Video tutorials. Nevertheless, here are a brief summary of guidelines:

1. Binomial scientific names

- a. must be *italicized* when word processed (i.e. typed): *Escherichia coli* or *E. coli*.
- b. must be underlined when handwritten
- c. have the 1st letter of the genus (i.e. *Escherichia coli*, or *E. coli*) in uppercase.

2. Mistakes

- a. **Cross mistakes only once**, write the date and your initials, and write the corresponding correction

3. Awarding full credit in the lab notebook

- a. Won't be able to award full credit in lab reports if:
 - 1) a binominal name is incorrectly written (**1-point deduction**)
 - 2) a mistake was not corrected accordingly (**0.5-point deduction**)

- 3) the corresponding information is not annotated by the start of lab a meeting (when the professor will examine the notebook) **(0.5-point deduction)**
 - Title of the lab exercise or experiment
 - Summary of protocols
 - Page is not numbered
 - Lab exercise is not annotated in the Table of Contents
- 4) the corresponding information is not annotated before leaving the lab (the professor will examine your notebook before leaving the lab) **(0.5-point deduction)**
 - Data for the corresponding experiment is not recorded
 - Interpretations for the data is not recorded

B. Pre-Lab Reading Assignments

1. Count a cumulative total of 30 total points
2. Will be available in Blackboard Learn (<http://mdc.blackboard.com>)
3. Deadlines are always 24 hours before class time: 5:40PM on Mondays.
4. New online questions will be available at 5:40PM on Tuesdays.
5. **Deductions:** less than 7 out of 10 questions answered correctly (0.5-point deduction).

C. Exams:

1. Two 100 points exams (Midterm and Final) will be administrated during regular laboratory periods. Refer to the syllabus schedule to know the dates of the exams. Each of the exams will be multiple choice questions. No scantrons are needed: questions will be answered on the printed exam provided. Won't be able to allow calculators.
2. At the next lab sessions, the students will receive a Scorecard of the exam and copy of the exam: **exams must be returned to the professor and cannot be photographed.** Academic Dishonesty regulations, as stated in the MDC student handbook, will have to be strictly enforced. Any violations will lead to a zero on the exam.
3. **There are no make-ups for Exams unless the** absence meets the requirements of the Attendance sections of this syllabus.

D. Quizzes:

1. During the first 15 minutes of each class section, cumulative quizzes (**10 points** each) will be administered. These quizzes will rehearse your knowledge with effortful learning and open-ended questions. They will also provide valuable information on how and what you are learning, and what areas you may need to work more.

E. Lab Skills Evaluation

	Lab Skill Evaluations	Points
I	Aseptic transfer of microbes (Exercise 1-3)	10
II	Streaking for isolation (Exercise 1-4)	10
III	Bacterial smears with Gram stain & Unknown (Exercise 3-7)	10
IV	Morphological and Physiological Unknown (Multiple Exercises)	70

XI. Incomplete Grades and Withdrawals

Incomplete (I) grades will be posted only in consultation between the student and professor, and only when extenuating circumstances will prevent the student to complete the requirements of the course. At least one half of the course must have been completed with a C or better grades. It is important that the incomplete (I) be completed within the timeframe agreed between the student and the professor. Unfortunately, if not completed within the agreed time frame the incomplete must be submitted as an F.

Withdrawals: The professor is not entitled to withdraw a student from the course: it is the students' duty to evaluate and monitor how he/she is doing in the course. Knowing your status in the course will be important in the case you determine it is necessary to withdraw from the course. The deadline to withdraw (W) from the course **November 1st, 2016**. Keep in mind that a "W" grade will be permanent in your grade transcripts, and constitute an attempt for the course.

XII. Tentative Course Schedule (schedule may change due to unexpected events)

(Note: Syllabus may be subject to change at the professor's discretion)

Date	Week	Topic	Due Dates, <u>Chapters to Read</u> , <u>Quizzes</u> , and <i>Exams</i>
Aug 23	W1	-Course Introduction -Syllabus -Lab Safety -Aseptic Transfer -Microscopy and Microbial Diversity	- <u>Section 3.3</u>
Aug 30	W2	- <u>Isolation Techniques</u> : --Streak Plate, -Spread Plate --Pure Cultures, Stock Cultures --Environmental and Human samples	- <u>Sections 1.4, 1.5, 2.1</u> -Quiz 1 (Wk1) - Bring Environmental Sample (any liquid or solid sample)
Sep 06	W3	-Simple stain -Negative stain -Capsule stain - Unknown Project (begin)	- <u>Sections 3.5, 3.6, 3.9, 5.31</u> -Quiz 2 (Wks 1 and 2)
Sep 13	W4	- <u>Differential Stains</u> : --Gram stain, Acid stain --Endospore stain --Unknown Project (cont)	- <u>Sections 3.7, 3.8, 3.10</u> -Quiz 3 (Wks 1 to 3)
Sep 20	W5	- <u>Biochemical Tests</u> : --SIM medium --TSI agar --Litmus milk medium --Blood agar --Unknown Project (cont)	- <u>Sections 5.20, 5.21, 5.23, 5.25</u> -Quiz 4 (Wks 1 to 4)
Sep 27	W6	- <u>Biochemical Tests</u> : --Phenol Red broth --MR/VP	- <u>Sections 5.3, 5.4, 5.5, 5.6</u> -Quiz 5 (Wks 1 to 5)

		--Catalase test --Oxidase test -Unknown Project (cont)	
Oct 04	W7	- <u>Biochemical Tests:</u> --Nitrate reduction --Start hydrolysis --Casein hydrolysis -Unknown project (cont)	- <u>Sections 5.7, 5.12, 5.14</u> Quiz 6 (Wks 1 to 6)
Oct 11	W8	- <u>Selective and Differential Media:</u> --PEA --MSA --MacConkey agar --EMB agar -Unknown project (cont) -Midterm Exam	- <u>Section 4.1, 4.4, 4.5, 4.6</u> -Midterm Exam
Oct 18	W9	- <u>Biochemical Tests (hydrolysis):</u> --Urea hydrolysis --Gelatin hydrolysis --DNA hydrolysis --Lipid hydrolysis -Unknown project (cont)	- <u>Sections 5.13, 5.15, 5.16, 5.17</u> -Quiz 7 (Wks 7 and 8)
Oct 25	W10	- <u>Effect of Physical Forces on Bacterial Growth:</u> --Effect of Temperature --Effect of pH --Effect of UV -Enumeration of Bacteria Water -Unknown project (cont)	- <u>Sections 2.9, 2.10, 2.13</u> -Quiz 8 (Wks 7 to 9)
Nov 01	W11	- <u>Effect of Chemicals on Bacterial Growth:</u> --Antibiotic -Unknown project (cont)	- <u>Sections 7.3</u> -Quiz 9 (Wks 7 to 10)
Nov 08	W12	- <u>Effect of Chemicals on Bacterial Growth:</u> --Antiseptics and Disinfectants -Unknown project (cont)	- <u>Sections 2.14</u> -Quiz 10 (Wk 7 to 11)
Nov 15	W13	-Pipetting	- <u>Videos and Handouts</u> -Quiz 11 (Wks 7 to 12)
Nov 22	W14	-ELISA	- <u>Video and Handouts</u> -Turn in Unknown Report
Nov 29	W15	-ELISA(cont)	-Turn in Lab Notebook
Dec 08	W16	-Final Exam	

Note: *Syllabus may be subject to change at the professor's discretion.*