Introductory Microbiology (BIO220)

John Ireland, Ph.D.

OFFICE:	136A McDivitt	**CLASS:**	T/R 11:00-12:30
EMAIL:	irelandjohn@jccmi.edu	**LAB:**	T 9:00-11:00
WEB:	docireland.org	**OFFICE:**	see website

TEXT: *Microbiology* Tortora et. al (Eleventh Edition, though back to the Ninth is fine with me)
LAB MANUAL: You need a lab notebook (I would suggest a bound composition book dedicated to the class)

COURSE DESCRIPTION

Basic structure and function of microorganisms with special emphasis on recent advances in microbiology, pathogens, disease, control and immunity. Strong biology background recommended. Course includes a laboratory component. Prerequisites are MTH020 or Higher and ENG085.

ASSOCIATE DEGREE OUTCOMES (from JCC Catalog):

ADO 4: Demonstrate Scientific Reasoning
ADO 7: Think Critically

COURSE OBJECTIVES

The course follows the course objectives as outlined in the current statement for Introductory Microbiology Course Objectives by the American Society for Microbiology (ASM). These objectives can be found at the following link.

GRADE SCALE

4.0 = 100 – 93.0%
3.5 = 92.9 – 85.0%
3.0 = 84.9 – 80.0%
2.5 = 79.9 – 75.0%
2.0 = 74.9 – 70.0%
1.5 = 69.9 – 65.0%
1.0 = 64.9 – 60.0%
0.5 = 59.9 – 55.0%
0.0 = 54.9 – 0%

GRADE DISTRIBUTION

Lab Reports	40 pts.
Lab Unknown	100 pts.
Lab Skills	60 pts.
Presentation	100 pts.
Exams	300 pts.
TOTAL	**600 pts.**

Percentage is calculated as a percentage of the total number of points.

All grades are rounded to three significant digits.
Point totals may be adjusted during the term for schedule/material reasons.

Course Policies

Course Communication

I maintain server space to host materials for my courses. The website (http://docireland.org) is where I will publish all notices for the course, post materials needed, and link copies of the PowerPoint files. This is my personal space and the materials are produced with my personal equipment. The materials are intended for your personal use in the class only.

Course Accommodation

Course accommodations (extra testing time, quiet testing area, etc.) can only be made with a completed accommodation form from the Center for Student Success (CSS) in response to documented need. Accommodations will only be made after I have received the paperwork from CSS and ***no retroactive adjustments will be made***. It is the responsibility of the student to seek accommodations that they are eligible to receive, and the accommodations must be reasonable within the context of the course.

Attendance and Participation

The school has a vested interested in making sure you are attending the classes in order to help you be successful. In light of this we, as instructors, must report your participation on a number of occasions throughout the semester. You will be reported as a V for *Verified* (meaning you are attending, participating and in addition passing), as an H for *Help* (meaning you are attending and participating, but not passing), or as Q for *Quit* (meaning you are no longer attending and/or participating in class). There are several reasons you may be listed as a Q, which I will address in a moment, but it is important to note that *once you have been dropped from a class by an instructor you cannot be put back into the class without the instructor's signature*.

Reasons for Being Assigned a Q

- Failure to attend class within the first week without contacting the instructor.
- Failure to attend class for greater than three (3) sessions without contacting the instructor.
- Failure to take two (2) Unit Exams
- Failure to take five (5) Daily Quizzes
- Failure to complete three (3) Laboratory Exercises

These conditions will result in an automatic Q during the next HQV reporting period and your dismissal from the course. If you fail to participate after the final HQV reporting period (1 week after midterm) you will not be automatically dropped from the course but will receive a grade of 0.0 (E) for failing to participate in the course.

Electronic Devices and Classroom Courtesy

All students have a right to the same classroom experience and opportunity to learn. Any disruptive behavior in my class will result in *your immediate removal and loss of all points possible on that day* (daily quiz, lab, unit exam, etc.). This includes the use of cell phones and other electronic devices. You are welcome to tape my classes for *your future personal use only* and use a laptop or tablet for scholarly pursuits but any use of devices that I deem distracting (yes, I am the one who decides) will be dealt with immediately.

Academic Integrity and Honesty

The following is the text from the JCC Catalog and Policy Statements about Academic Honesty.

Any students found cheating and/or plagiarizing will receive a grade of 0.0 for the assessment. A second offense will result in a grade of 0.0 for the course. ALL INCIDENTS WILL BE REPORTED TO THE ACADEMIC DEAN

Faculty members who suspect a student of academic dishonesty may penalize the student by taking appropriate action up to and including assigning a failing grade for the paper, project, report, exam, or the course itself. Instructors must document all instances of academic dishonesty beyond those of a very minor nature, in writing to the Office of the Academic Deans using the attached form.

Students, who are suspected of cheating during a course exam or course placement in the testing lab, will be questioned and reported to the appropriate faculty member or Executive Dean of Students. The proctors are not to stop the exam but report the questionable behavior. As in other instances, the faculty will determine the penalty and appropriate action. If the student is suspected of cheating on course placement, the Executive Dean of Students is to be contacted and will determine the next steps.

The Office of the Academic Deans will record and track students who have been reported as having cheated. If the same student has a second incident, the dean will enact sanctions appropriate to level of infraction. The sanction will be selected in consultation with the involved faculty. The Dean can administer consequences up to and including suspension.

Definitions:

Academic Honesty: Is defined as ethical behavior that includes student production of their own work and not representing others' work as their own, by cheating or by helping others to do so.

Plagiarism: Is defined as the failure to give credit for the use of material from outside sources. Plagiarism includes but is not limited to:

- Submitting other's work as your own
- Using data, quotations, or paraphrases from other sources without adequate documentation
- Self-plagiarism – is the reuse of significant, identical or nearly identical portions of one's own work without acknowledging that one is doing so or without citing this original work

Cheating: Is defined as obtaining answers/material from an outside source without authorization. Cheating includes, but is not limited to:

- Plagiarizing in any form
- Using notes/books without authorization
- Copying
- Submitting others' work as your own or submitting your work for others
- Altering graded work
- Falsifying data
- Exhibiting other behaviors generally considered unethical

(http://www.jccmi.edu/policies)

Incomplete Policy

The following is the text from the JCC Catalog and Policy Statements about an Incomplete.

Students may receive an "I" if, ***at least 90 percent (or as otherwise designated within the course syllabus) of the coursework is completed with an average grade of 2.0*** to meet the objectives as specified in the course syllabus. The student shall complete appropriate documentation and follow defined procedures to request an incomplete grade considered. The course objectives are to be satisfactorily completed during the next semester or within a shorter period of time as determined by the instructor. The instructor and student shall work together to determine when the work is to be completed taking into consideration any extenuating circumstances which may cause the one semester to be extended; however, a due date is required. If the student does not complete the course within the designated period, the Registrar will replace the "I" grade with the earned grade as originally assigned by the instructor.

The grade of "I" is not awarded to students who did not attend, seldom attended, or to those who simply are not pleased with their final grades. Students receiving an "I" submit only the remaining work that had not been completed at the end of the semester. Students do not redo work that had already been graded. (*http://www.jccmi.edu/policies*)

Extra Credit and Missed Work

There is no extra credit available, per department policy, and no make-up/late work. Any deviation from this is solely at my discretion. If I do make an exception to any policies in the course they will be communicated in written (email) form for future reference.

Course Assessments

Unit Exams

There will be four (4) in class exams during this course. The highest three (3) grades you receive will be counted towards your final grade. The goal of the in class exams is to gauge your basic understanding, retention and application of the information discussed in class. You will be allowed one and a half hours for the exams, though typically students complete the exams within 45-55 minutes. You will be allowed a 3"X5" index card for each exam, though I caution you to not rely on it. It is the assumption that you will be able to not only recall concepts but utilize the information to solve problems presented. The exams will be a combination of the following: multiple-guess, matching, true/false, fill in the blank, problem-solving, diagrams and short answer. Each Unit Exam is worth one hundred (100) points and I count the highest three (3) towards your final grade.

Presentation

Each student will be assigned a pathogen at random early in the term. You will be required to research the organism and present an eight to ten (8-10) minute informational presentation to the class at the end of the term. The assignment will be laddered with various sub assignments due throughout the term. Details are at the end of the packet.

Lab Reports

You are required to keep a lab notebook for the class. This notebook should be a clear, concise and complete record of your lab activities, procedures, results and conclusions. At a number of times throughout the term you will be requested to submit a short report about the lab you have completed.

The notebook will also serve as your procedural manual, so once you have had a lab experience with a given technique, I will expect you to be able to utilize that technique in the future from your experience and lab notes. **Failure to attend lab, submit the lab notebook, or complete work will result in point deductions, the magnitude of which is at my discretion.**

Lab Unknown

The purpose of the lab is to learn to utilize the methods and techniques of the lab. To assess this understanding we perform an unknown identification at the end of the term. This project will be laddered.

Lab Competence

There are a number of procedures in the lab you must demonstrate a mastery of. The tasks will be assigned, demonstrated and assessed for each student on an individual basis. Some of the tasks will be completed in a single lab, others will take a couple of labs to complete. Details are found later in the packet.

Grade Normalizations

All Unit Exams will be subject to a grade normalization (what many of you call a curve). The extent of the normalization will be the lowest positive or zero value of the following conditions.

- The points needed to bring the class median to 74%
- The points needed to bring the highest score to 100%

Use of Notes and Study Guides

I have gone back and forth on these topics throughout my teaching career and have decided on the following policy. No study guides will be provided. I know this sounds harsh, but the policy is from my years of experience and my expectations for work you will be required to do in the future. I find that the use of study guides consistently leads to students expecting the test to be specifically off the study guide which is not what the exams are about.

For the Unit Exams a **3"X5" handwritten notecard** may be used.

Submission of Class Assignments

All written class assignments (lab reports and presentation materials) must be submitted electronically. The files should be in Microsoft Office format (Word, Excel, or PowerPoint) and must be received by me before the start of class on the due date. Late files, files in a non-Office format, or unreadable files will result in a complete loss of the points for the assignment. The failure of email at the last minute is not an acceptable excuse and only failure of JC email systems will be taken into consideration.

Laboratory Assessment

Assessment Criteria

- **Lab Notebook**
- **Lab Skills**
- **Unknown Project**

Lab Reports

At various times of the semester you will be required to submit a short report about particular labs. These lab reports will be evaluated for completeness and correctness. These reports will be worth ten (10) points apiece and will account for 40 of the 600 total points. In addition, I may request to see and review your lab notebook at any time and failure to produce a complete and current notebook will result in an automatic deduction of 10% from the lab report score (meaning 0.5% of the total grade). Deductions will also be made if you do not have procedures in your notebook, and are unable to find them on request.

Lab Competence

Microbiology is a very practical science. To this end you will be evaluated on your ability to accomplish a number of defined laboratory tasks throughout the semester. The assessments and their point values are listed below. Some of the tasks will be accomplished in a single lab session, while others will measure your consistent performance over several trials. The skills will be judged on the following criteria. Please note that while there is a level of subjectivity to these measurements it is based on my experience as an educator and user of these techniques for many years. This type of assessment is common in practical disciplines and will be common in training for health care fields.

Scoring Rubric for Lab Skills

Points	Classification
10	Can complete work without assistance after demonstration and shows excellent characteristics of the skill tested.
8	Can complete work without assistance after demonstration but some flaws in technique are evident.
6	Can complete work with minimal assistance from instructor but final product is correct.
4	Can complete work with minimal assistance from instructor but final product shows flaws.
2	Requires significant input from instructor to complete task in time allotted but task is completed.
0	Work is not completed within the time allotted or shows serious deficit in technique.

Assessment

1. Demonstrate basic use of the microscope to high power
2. Demonstrate use of the oil immersion lens
3. Correctly Gram Stain a set of known samples, as provided by the instructor
4. Correctly Endospore stain a known sample, as provided by the instructor
5. Achieve single-colony isolation on a streak plate (free of contamination) from a sample provided by the instructor.
6. Correctly identify unknown samples by Gram Stain

Lab Unknown

The lab unknown is the practical capstone of the lab course. You will be using the various techniques and tests that you have worked on over the term to identify an unknown organism from a list of possible microbes. The assignment has several parts and will require some research on your part.

Part 1: Key Development (10 Points)

You will be given a list of the possible microbes for the assignment and a list of available tests you can perform. You will have a week to develop a dichotomous key that allows you to differentiate the known organisms from each other.

Part 2: Gram Stain and Morphology (30 Points)

Since the Gram stain is so important to accurate identification of your organisms each isolate must be Gram stained and the results reported to me by the end of lab the second week of the Unknown. If you are incorrect you will be told the correct results, but lose the points. In addition you will also report on the morphology and endospore status of your organism.

Part 3: Identification (60 Points)

The last step is to set up your biochemical tests and evaluate your organism based on the key you developed. The score is based on the accuracy of your test results, your analysis and final identification.

Student Presentation Assignment Outline

Assessments	**Point Values**
References	10
Taxonomy and Synopsis	20
Talk Outline – Draft	1
Talk Outline – Revision	29
Oral Presentation	40
Total	**100**

Purpose of Assignment

The purpose of this assignment is to give you exposure to and experience with presenting technical material in an oral format. While colleges do a pretty good job of developing your writing style, it is rare that we put significant emphasis on your ability to present to an audience. Even when we do have you give presentations, they are typically on topics you have chosen yourself and are therefore at least casually familiar with. This presentation will be on a specific microbe (bacterium, virus, helminth or protozoan) that is randomly assigned to you. The talk should be eight to ten (8-10) minutes in length with an accompanying PowerPoint presentation.

Assignment of Microbe

Each student will receive a random student number on their first graded assessment (Exam 1). This number is to look up your grade when they are posted AND is the number of your microbe on the list posted on the class blog. You will have your assigned organism one week before the first assignment is due.

What if I REALLY want to do my talk on a specific microbe?

Too bad, simply put. Part of the assessment is in how you deal with topics you may know nothing about at the start. It is common in business or industry to be assigned to work up a report on materials you could care less about, but you still have to do a professional job.

Assignment 1: References

For the first assignment you must submit a list of a minimum of five (5) relevant reference sources for your microbe. These references must formatted in the APA (the most common style guide for Nursing and Sciences) or MLA (the style used in English) style. All references must have a direct attributable author (that means no Wikipedia) unless they come from military (.mil on the web), governmental (.gov on the web) or the United Nations (www.who.int). **All web references must include the complete address for cross-checking, even though this is no longer formally part of the MLA or APA styles**. This assignment will be worth ten (10) points.

Assignment 2: Taxonomy and Synopsis

The second assignment is a one paragraph synopsis of your organism covering what it is, what it causes or does, and where is can be found? The total assignment is worth twenty (20) points, and new references do not need to be included.

Assignment 3: Talk Outline – Draft

For this assignment I want a rough draft outline of your talk. Most of your will either write too much or too little for this draft and that is fine; it is a rough draft, a way to get your thoughts down. You need to cover the following topics:

- Discovery and History of the Microbe
- Basic Physiology of the Microbe
- Pathology of the Microbe
- Epidemiology of the Microbe
- Treatment or Prevention of the Microbe

Note, that all of these topics must be covered but that does not mean you will have only five slides. For an eight to ten minute talk I would expect between six and twelve slides. The outline should be organized by slides and discuss both the explicit material on the slide and the points to be discussed during that slide. I have posted a sample outline on the course website for you to use as inspiration.

Assignment 4: Talk Outline – Revision

I will return your Draft Outlines to you and you will then take the feedback and improve them. You proceed to producing a rough version of the PowerPoint for me to evaluate. Together, the Draft and Revision are worth twenty-nine (29) points.

Can I have you look at my PowerPoint after the Revision, but before the Presentation?

As long as you give me at least a day before you have to give the talk, sure. I am more than happy to look at your work as it progresses and give you feedback, just allow me enough time to give reasonable pointers.

How do we get the presentation to class?

Most people bring their presentations to class on a USB drive, or have it loaded on their email accounts. You may also email it to me prior to class. I will load everyone's talks onto the classroom desktop at the start of the class to help aid the transition between talks. I'll even let you use my fancy laser pointer/clicker**. I AM NOT RESPONSIBLE FOR YOUR LOADING OF A FILE OR TRANSFER OF A FILE, FAILURE TO HAVE YOUR MATERIALS WILL RESULT IN A PENALTY OF TWENTY (20) POINTS FOR RESCHEDULING.**

Assignment 5 – Presentation

The presentations will be run during two class periods. I will allow you to choose which of the two days you present until slots are filled. You are REQUIRED to attend both days and there is a ten (10) point penalty if you do not. Quite honestly, it would be quite rude if you did not attend your colleagues' presentations simply because you were done.

The Presentation counts for forty (40) points of the overall grade.

When will I know my presentation grade?

I grade them as they are completed, so you will get the final grade at the end of the class… since I have to make sure that the people who go first show up for the second day.

Course Schedule (subject to change with notification)

Class Date	Lesson	Chapter(s)	Lab
1/19	Syllabus/Nature of Science	NA	Lab Intro/Plate Inoculation*
1/21	Intro to Microbiology/Chemistry	1, 2	
1/26	Chemistry and Macromolecules	2	Use of Microscope
1/28	Cell Structure	4	
2/2	Cell Structure	4	Gram Stain
2/4	**EXAM 1**		
2/9	Enzyme Structure and Function	5	Endospore Stain
2/11	Metabolism and Glycolysis	5	
2/16	Respiration and Fermentation	5	Dilution Plating*/Streak Plates
2/18	Growth of Microbes	6	
2/23	Growth/Control of Microbes	6, 7	Heat Resistance of Microbes*
2/25	Control of Microbes	7	
3/1 & 3	**SPRING BREAK**		
3/8	**EXAM 2**		MPN Method*
3/10	DNA and Genetic Structure	8	
3/15	Molecular Genetics	8	Fungi Survey*
3/17	Genetics and Biotechnology	9	
3/22	Biotechnology and Evolution	9	Use of Key on Unknown*
3/24	Systematics and Taxonomy	10	
3/29	Systematics and Taxonomy	10	Mixed Culture Isolation
3/31	**EXAM 3**	12	
4/5	Eukaryotes: Fungi	12	Unknown 1
4/7	Eukaryotes: Protozoan and Worms	13	
4/12	Viruses	13	Unknown 2
4/14	Viruses	14	Unknown 3
4/19	Disease and Epidemiology	14, 15	
4/21	Epidemiology/Pathogenesis	15	Unknown 4
4/26	Pathogenesis		
4/28	**EXAM 4**		
5/3	**PRESENTATIONS 1-16**		
5/5	**PRESENTATIONS 17-24**		

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Learning Contract

I, _____ (print your name), have been given a copy of the syllabus/policies for General Biology I (BIO161) taught by Professor John Ireland, during the Winter 2016 term at Jackson College. The following conditions for the class were explained to me during class.

- Copies of the PowerPoints are provided in an electronic archive for the course, but hardcopies of these slides are not allowed to be used for the quizzes.
- There are no make-up labs or exams in the class. Periodic absences are accounted for in the dropped grade policy for the course.
- While the occasional absence or tardiness in this class can be absorbed by dropped grades, the student is still responsible for the missed information and any schedule changes that occur during your absence.

- Lab attendance is required for the course. Failure to attend three (3) labs will result in the automatic failure (with a grade of 0) of the course.

- Only reasonable accommodations properly registered and reported by the Center for Student Success (CSS) will be honored in the class, no other changes to class protocol are to be assumed.
- A preliminary schedule for the class was given to the class in the syllabus, but it is possible that dates may change. Any major assessment (exams, lab quizzes, or formal lab) day changes will be done with at least seven (7) days notice to the class. This does not pertain to daily quizzes.
- Absences are not judged as excused or unexcused. The student is assumed to be an adult and capable of prioritizing their lives and class, so no consideration will be given for early/late testing due to absences for personal reasons (i.e. vacations during term). The performance of governmental service (military, jury duty, etc.) is the exception to this rule and will require documentation.
- Medical leave is subject to the dropped scores policy, and occasional absences for such will be handled through that policy. If extensive medical concerns occur, it is the responsibility of the student to seek a withdrawal for medical reasons, or an incomplete (if appropriate).

- The audio recording of the lectures is permitted for personal use, as are still images of materials or specimens. However, no video recording or public sharing of class materials is allowed.

These conditions and all assessment criteria/policies of the class were explained during the first meeting of the class. I have been given a minimum of thirty-six (36) hours to review the materials outside class and email any questions to the professor. I agree to abide by the requirements of the course as outlined in the syllabus and other materials provided.

Signature: _____ Date: _____