MICROBIOLOGY with LAB

BIO 204-601

Spring 2020 NATURAL SCIENCES

Course Information

Credits: 4 credits
Pre/Co-requisites: BIO 111 or comparable general biology course strongly recommended
Meetings/Times: Tuesdays and Thursdays 9:00-11:40am
Location: SP125 (Sunlight Peak)
Department Assistant: David Bova; david.bova@frontrange.edu; SP224; (970) 204-8148
Microbiology Faculty Contact: Heidi Smith; heidi.smith@frontrange.edu; SP222; (970) 204-8148
College Website: www.frontrange.edu

Instructor Information

Instructor: Kristopher Parker
Email: kristopher.parker@frontrange.edu
Voicemail: (970) 267-2389
Office Hours: by appointment only (see: Tutoring and Coffee Hours)

Course Materials

1. **REQUIRED:** CONNECT for Microbiology: A Systems Approach (5th Ed.) by Cowan
   - IMPORTANT NOTE: Your textbook materials are part of FRCC's inclusive access program, which means you are getting the lowest price of the materials automatically added to your course fees. Registration and access to these materials is obtained through a direct D2L link to the CONNECT system.
2. **REQUIRED:** download the individual lab exercises from Desire2Learn (D2L)
3. **REQUIRED:** lab coat
4. **Optional:** You can purchase a print copy of the textbook. Loose-leaf three-hole punched versions are available in the bookstore or directly through the CONNECT website once you are registered.

Important Dates

First Day of Class: **January 21, 2020**
Attendance Deadline: **January 26, 2020**
Last Day to Drop with refund (and no W recorded): **February 5, 2020**
Payment Deadline: **February 25, 2020 (6pm)**
Spring Beak: **March 16, 2020 to March 22, 2020**
Graduation Application Deadline: **April 1, 2020**
Last Day to Withdraw (W recorded and no refund): **April 18, 2020**
Last Day of Class (BIO204): **May 7, 2020**
Last Day of Class (FRCC): **May 11, 2020**

Tutoring and Coffee Hours

Tutoring: Paid tutors are available to assist students in learning the course material.
- **Tutoring Location:** Science Support Center located in Mount Antero Room 355
- Mondays 2:30-4:00pm; tutor: Karen Sellins
- Tuesdays 3:00-4:30pm; tutor: Kristopher Parker

Coffee hours: Part-time instructors are not required to host formal office hours; however, I have chosen to host bi-weekly coffee hours on my own time. Feel free to drop-in to discuss the course or have informal conversations about Life, the Universe and Everything. I ask that students not abuse these hours; they will begin and end promptly at the designated times. *Location/time subject to change.*
- **Coffee Hours Location:** The Peak Café (Longs Peak Student Center)
- **Coffee Hours:** Tuesdays and Thursdays 7:00-8:00am

CCCS REQUIRED SYLLABUS INFORMATION

Catalog Course Description

Designed for health science majors. Examines microorganisms with an emphasis on their structure, development, physiology, classification, and identification. The laboratory experience includes culturing, identifying, and controlling microorganisms with an emphasis on their role in infectious disease.

Course Learning Outcomes

1. Demonstrate an understanding of the terminology and principles of basic chemistry, cell structure and function, bioenergetics, cell reproduction and genetics, microbial taxonomy, and Darwinian evolution.
2. Demonstrate an understanding of microbial cell biology and genetics.
3. Demonstrate technical laboratory skills, such as microscopy, aseptic techniques, culturing and isolation, and media and material preparation and sterilization.
4. Demonstrate cognitive laboratory skills, such as collection and analysis of data, identification of microbes, and communication of results.
5. Demonstrate an understanding of terminology and principles of immunology, epidemiology, and virology.
6. Integrate themes by examining microbial evolution, diversity, and disease.

Topical Outline

Please refer to the Course Schedule for a detailed breakdown of topics and assignments by date.

1. Introduction: Nature of Science, Historical Perspective of Microbiology and Survey of Microbes
2. Fundamentals of Chemistry
3. Microscopy and Cell Structure
4. Microbial Cell Biology
    a. Structure and Function
    b. Metabolism
    c. Growth
5. Genetics
    a. Inheritance
    b. Mutations
    c. Genetic Engineering
6. Taxonomy
7. Prokaryote and Eukaryote Microbes
8. Viruses
9. Interactions and Impact of Microbes and Humans
    a. Microbial Pathogenicity Mechanisms
    b. Epidemiology
    c. Immunology
    d. Antibiotics and Control of Microbial Growth
10. Integrating Themes
    a. Microbial Evolution, Diversity, and Disease

Guaranteed Transfer (GT) Pathways Course Statement

The Colorado Commission on Higher Education has approved BIO 204 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to: http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

Natural and Physical Sciences Content Criteria GT-SC1

https://highered.colorado.gov/academics/transfers/gtpathways/criteria/content/content_natural_physical%20sciences_2016_06_02_CCHE_approved.pdf

Competencies and Student Learning Outcomes for GT-SC1

1. Inquiry and Analysis: https://highered.colorado.gov/Academics/Transfers/gtPathways/Criteria/Competency/Competency_Inquiry_and_Analysis.pdf
2. Quantitative Literacy: https://highered.colorado.gov/Academics/Transfers/gtPathways/Criteria/Competency/Competency_Quantitative_Literacy.pdf

Academic Honesty

Students are expected to uphold FRCC's Student Code of Conduct relating to academic honesty and assume full responsibility for the content and integrity of the academic work they submit. The guiding principle of academic integrity will be that a student's submitted work, examinations, reports, discussions, and projects must be that of the student's own work and unique to the course. Students are guilty of violating the honor code if they:

- Represent the work of others as their own (this includes copying material from the Internet for assignments without proper citation)
- Use or obtain unauthorized assistance in any academic work.
- Give unauthorized assistance to other students.
- Modify, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit.
- Misrepresent the content of submitted work.
- Are seen with an electronic device in their hands at any time during an exam.
- The penalty for violating the honor code is severe. Any student violating the honor code is subject to receive a failing grade for the course and will be reported to the Office of Student Affairs. If a student is unclear about whether a particular situation may constitute an honor code violation, the student should contact the instructor to discuss the situation.

Collaboration. Unless otherwise instructed, all work submitted is to be done individually by the student. This means you should not be working in pairs or in a group to complete assignments, take quizzes, and other assessments unless specifically asked to do so by your instructor.

Plagiarism / Dual Submission. Plagiarism, whether intentional or accidental, is academic dishonesty and may incur disciplinary action ranging from receiving a zero on an assignment or failing a course to more severe consequences. Plagiarism means:

- Using someone else's ideas and not correctly citing that use. This means that if you put someone else's work into your own words, put it in your work, and do not correctly document it, the idea is plagiarized.
- Using someone else's words without quotation marks and not correctly citing that use.
- Using someone else's images or other works (such as from the Internet) without correctly citing that use.
- Submitting work that has been turned in for credit in another class or at another institution unless specifically permitted by your instructor.

Student Rights, Responsibilities, and Resources

For important information on rights and responsibilities of all FRCC students, as well as the many support resources available to you, please refer to the link to "Student Rights, Responsibilities and Resources" on D2L. Topics include:

- Course Questions
- Access to Course Materials
- Student Email
- Student Drop for Non-Attendance
- Payment Deadline
- Financial Aid
- Academic Assistance
- Disability Support Services
- Use of Audio / Video Recordings
- Crisis Counseling and Stress Management
- FRCC Cares
- Notice of Non-Discrimination
- Mandatory Reporting (Title IX)
- Student Code of Conduct
- Philosophy of Inclusion

COURSE OVERVIEW

Instructor's Overview of the Course

The broad goal of this course is to facilitate the acquisition of a microbiology vocabulary that will enable learners to responsibly apply microbiology knowledge as a tool to enact positive change within the context of their chosen fields. Acquisition of this knowledge will be facilitated through content-based lectures, completion of laboratory modules, and participation in online activities.

Graded Instructional Activities ~ Overview

1. CONNECT Preparation for Microbiology Module (30 points total). Microbiology builds on many fundamental concepts typically learned in a 100-level biology course. A timed diagnostic tool has been built in CONNECT to determine the learner's level of preparation for this course. Full points will be awarded for the **completing this assignment by 8:00am on January 23, 2020**. Detailed information will be provided in-class regarding how to interpret/use results to achieve the best chance of success in this course. *Students that score below a certain percentage will be required to complete two additional assignments (Boot Camps) to earn full points.*
2. CONNECT Reading Assignments (100 points total): For each chapter, there is a required CONNECT reading assignment (LearnSmart). The cumulative percentage earned on all readings will be used to determine the grade out of 100 points (e.g. cumulative 93% = 93 out of 100 points). Readings relate directly to the lecture material that will be covered during the class immediately following their due date. These are open resource and are **due one hour before the class of their respective lecture** (see: Course Schedule). *Only the first attempt will be recorded as a grade.*
3. CONNECT Quizzes (140 points total): CONNECT quizzes are graded separately from readings. They are open resource and are **due by 8:00am before the class of their respective exam review** (see: Course Schedule). It is strongly recommended to take quizzes as their respective chapters are covered in-class and then use them as practice prior to attending the exam review. Quizzes are worth 10 points each and the fourteen highest quiz scores will be recorded out of 140 points (i.e. the two lowest quiz grades will be dropped). *Only the first attempt will be recorded as a grade.*
4. Current events poster assignment (80 points total). From studies of the human microbiome to emerging antimicrobial resistance, advances in biotechnology, and microbial impacts on climate change, popular press articles about microbiology are ubiquitous. Students will form groups based upon an area of interest. Groups will then select a specific topic of focus and use press articles, the scientific literature, and other resources to prepare a 'mock' poster. A total of 8 points may be earned for meeting deadlines and **submitting a completed poster by 8:00am on April 28, 2020.** Each student will complete a self evaluation and an evaluation of individual group member's participation and contribution throughout the process. Points will be awarded out of 16 based upon these evaluations. The remaining 56 points will be determined by the instructor based upon the criteria outlined in the rubric. Additional details will be given in-class and made available on D2L. *Groups will have the option to present their poster for extra credit (see: Extra Credit).*
5. Lecture Exams (100 points each; 400 points total). Lecture exams will include any information covered in the required CONNECT Learning Modules and in-class lecture-related material. Exams include multiple-choice, true-false, matching, short-answer, fill in the blank, and problem-solving questions. All exams and the final will be taken in-class (see: Course Schedule). **Exams 1, 2, and 3 are closed resource. The final exam is cumulative and will be limited resource** (i.e. hand-written notes are allowed; more details will be provided prior to the final). Chapter outlines will be provided on D2L as well as an in-class review session. CONNECT learning modules will be made available all semester for practice and preparation for exams.
6. Unknown Lab Report. All lab exercises contain results and questions that learners are responsible for completing as part of the laboratory component of this course. However, only a formal report for Lab Ten will be collected as a graded assignment. Detailed expectations will be given in advance of the lab exercise, *but it is important to note that attendance and participation in previous lab exercises will be part of the points for this graded assignment.* **The Unknown Lab Report is due by the end of class on April 23, 2020**.
7. Comprehensive Lab Practical Exam. A comprehensive practical exam will be **administered on May 7, 2020** and will include the techniques and information covered across all lab exercises in the course. The lab practical is closed resource. A study guide is provided on D2L. Several review opportunities will be provided for learners.

Δ *Extra Credit:* Groups will be given the option to prepare a 10-minute presentation overviewing their Current Events Poster for up to 16 points of extra credit. An additional 4 points extra credit will be provided throughout the semester.

Grades ~ Breakdown, Scales, and Standards

Activity	Contribution to overall grade
Lecture Exams	400 points (100 points each)
Comprehensive Lab Practical	150 points
CONNECT Quizzes	140 points (10 points each)
CONNECT Reading Assignments	100 points
Unknown Lab Report	100 points
Current Events Poster	80 points
CONNECT Prep for Micro	30 points
Total	**1000 points**

These are the letter grades that will be reported for your official transcript based on the number of points earned throughout the course:

Letter Grade	Range
A	895 to 1000 points (89.5% to 100%)
B	795 to 894 points (79.5% to 89.4%)
C	695 to 794 points (69.5% to 79.4%)
D	595 to 694 points (59.5% to 69.4%)
F	Less than 594 points (< 59.4%)

Late Work/Make up Work Policy

1. Missed CONNECT Reading Assignments and Quizzes: You are responsible for completing every assignment on time. *There will be no makeup quizzes or homework assignments, including those missed due to illness, accident, unforeseen emergency, or individual computer issues.* It is for these reasons that two quizzes will be dropped from your final grade. Please do not email me a request to reset deadlines as this cannot be done for one individual student. If a CONNECT assignment is missed, it can still be completed after the due date as a study attempt for no points.
2. Makeup Labs: *Due to the nature of the materials used in this course, there are no makeup labs.* When you are absent, you affect your entire lab group by placing extra work on their shoulders. Therefore, it is imperative that you attend every class as there is a lab component to almost every scheduled meeting. If you are absent, you will still be docked related points on the Unknown Lab Report, and you will still be tested on the material. It is your responsibility to check with your group to learn what was missed. *There is no credit given for late Unknown Lab Reports;* these will only be accepted in person or electronically through D2L until the end of class on the specified due date.
3. Makeup Written Exams: *All students are allowed one makeup written exam missed due to illness, accident, unforeseen emergency, or any other circumstance.* **This is a no questions asked situation**. (i.e. the instructor will not ask why an exam was missed; please do not provide that information). Students must contact the instructor within 24 hours of the missed exam. The instructor will provide an exam to the Testing Center for students to take within one week of the missed exam. The makeup exam will cover the same content as the one missed, but it may be in an entirely different format.
4. Makeup Lab Practical: *There is absolutely no makeup lab practical exam* so make sure that you do not miss this exam. If you do miss this exam, you receive an Incomplete (only if you qualify) and will be required to take the practical at the end of the next semester to receive credit.

Attendance, Participation, and Conduct

Attendance/Participation. Student attendance and participation in this course are essential to learning the material. Students are expected to attend each laboratory session, be on time, and stay for the entire session. There may be time remaining after the completion of lab exercises. Come prepared with questions on chapter materials so these can be addressed during that time. *The last date of attendance is recorded and may have financial aid implications for students that do not pass the course.*

Classroom Conduct. Students are expected to assist in maintaining a classroom environment that is conducive to learning and is respectful to the instructor and other students. Students should not be using cellular phones, tablets, or laptops for anything except academic research as part of class activities. Offensive remarks, disruptive activity, or unsafe laboratory practices will not be tolerated, and you may be asked to leave the classroom and potentially lose points for an activity.

Food/Beverages: No food or drink of any kind, *including water*, is permitted in the class at any time.

Course Schedule

Week/Day	Date	Lecture Topic	Lab	DUE
1: Tue.	Jan. 21	Syllabus Overview Chapter 1, part 1	Overview and Lab Safety	NA
1: Thu.	Jan. 23	Chapter 1, part 2	1: Microscopy	Diagnostic Tool; Reading, Ch 1
2: Tue.	Jan. 28	Chapter 3	2: Aseptic Technique	Reading, Ch 3
2: Thu.	Jan. 30	Chapter 4	2: Aseptic Technique	Reading, Ch 4 Boot Camp Part 1
3: Tue.	Feb. 4	Chapter 5	NA	Reading, Ch 5
3: Thu.	Feb. 6	Chapter 6	3: Smears and Stains	Reading, Ch 6; Boot Camp Part 2
4: Tue.	Feb. 11	Exam 1 Review	3: Smears and Stains	Quizzes Ch 1, 3, 4, 5, 6
4: Thu.	Feb. 13	Exam 1 (Ch 1-6)	3: Smears and Stains	NA
5: Tue.	Feb. 18	Chapter 7	4: Isolation and Enumeration	Reading, Ch 7
5: Thu.	Feb. 20	Chapter 8, part 1	4: Isolation and Enumeration	Reading, Ch 8, part 1
6: Tue.	Feb. 25	Chapter 8, part 2	5: Environmental Preferences	Reading, Ch 8, part 2
6: Thu.	Feb. 27	Chapter 9	5: Environmental Preferences	Reading, Ch 9
7: Tue.	Mar. 3	Chapter 10, part 1	6: Transformation	Reading, Ch 10, part 1
7: Thu.	Mar. 5	Chapter 10, part 2	6: Transformation	Reading, Ch 10, part 2
8: Tue.	Mar. 10	Exam 2 Review	7: Control and Growth	Quizzes Ch 7, 8, 9, 10
8: Thu.	Mar. 12	Exam 2 (Ch 7-10)	7: Control and Growth	NA
	Mar. 17	Spring Break - No Class		
	Mar. 19	Spring Break - No Class		
10: Tue.	Mar. 24	Chapter 11	8: Gram Negative Characterization	Reading, Ch 11
10: Thu.	Mar. 26	Chapter 12, part 1	8: Gram Negative Characterization	Reading, Ch 12, part 1
11: Tue.	Mar. 31	Chapter 12, part 2	9: Gram Positive Characterization	Reading, Ch 12, part 2
11: Thu.	Apr. 2	Chapter 13, part 1	9: Gram Positive Characterization	Reading, Ch 13, part 1
12: Tue.	Apr. 7	Chapter 13, part 2	10: Identifying an Unknown Isolate	Reading, Ch 13, part 2
12: Thu.	Apr. 9	Exam 3 Review	10: Identifying an Unknown Isolate	Quizzes Ch 11, 12, 13
13: Tue.	Apr. 14	Exam 3 (Ch 11-13)	10: Identifying an Unknown Isolate	NA
13: Thu.	Apr. 16	Chapter 14	10: Identifying an Unknown Isolate	Reading, Ch 14
14: Tue.	Apr. 21	Chapter 15	11: Epidemiology	Reading, Ch 15
14: Thu.	Apr. 23	Chapter 16 Chapter 17	12: ELISA	Reading, Ch 16 and 17; Unknown Lab Report
15: Tue.	Apr. 28	Poster Presentations Final Exam Review	NA	Current Events Poster
15: Thu.	Apr. 30	Final Exam Review	Lab Practical Review	Quizzes Ch 14, 15, 16, 17
16: Tue.	May 5	Lecture Final Exam (Cumulative)		NA
16: Thu.	May 7	Comprehensive Lab Practical Exam		NA

NOTE: A section-wide review for the Comprehensive Lab Practical Exam will be given by Heidi Smith on Wednesday, April 29 (time to be announced). *Students are strongly encouraged to attend this review.*