

Biology 31 (BIOL 31) Microbiology

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| <i>Semester: Spring 2023</i> | <i>Reedley Community College</i> |
| Instructors: Lecture: Andrew Strankman Email: andrew.strankman@reedleycollege.edu | <i>Class No. 51031</i> Lecture: Tu/Th 9:00-10:15am Lab Times: Tu/Th 10:30-1:20pm Room: LFS-6 |
| Phone: 559-494-3000 ext. 3196 Office Hours: TBD | Office: LFS 5 |
| <i>Date: 01/09/23-05/19/23</i> | *virtual office hours can be accessed through zoom, or email. |

Catalog Description: Microbiology, 5 units, 3 hours lecture, 6 hours lab, including classification, morphology, identification, and physiology of microorganisms. May include a field trip.

This course provides an introduction to the structure, metabolism and ecology of microorganisms with special emphasis on microbe-related human diseases. This course is designed to introduce the student to a variety of topics in the area of microbiology. The text, lab manuals, and lectures are geared to students in biological, medical, physical education and health-oriented programs. PREREQUISITES: Biology 1 or 5 or 11A and Chemistry 3A or 1A. ADVISORIES: English 1A Math 201. (A, CSU-GE, UC, I)

Prerequisites: Successful completion of Biology 1 or Biology 5 or Biology 11A and Chemistry 1A or 3A. Recommended: Successful completion of Biology 20 and Biology 22.

Learning Outcomes:

- Develop important critical thinking skills as they evaluate the results of laboratory experiments and demonstrations.
- Develop important manual dexterity skills associated with operation of technical laboratory equipment (microscope, autoclave, agar plates, sterile technique apparatus, Enterotubes).
- Identify the basic structure, metabolism and ecology of a variety of microorganisms (viruses; bacteria; fungal, protozoan, and helminth parasites) which in turn, will allow them to better understand how these microbes function in their specific environments
- Learn how some microorganisms are beneficial to mankind while others cause a variety of human diseases.
- Learn to use the scientific method and be able to evaluate a variety of laboratory experiments (such as Identification of Unknowns, Biochemical Tests, Temperature Effects on Growth, Antibiotic Sensitivity).

Objectives:

- BIOL-31 Objective 1: Identity and classify microorganisms based on their structure, metabolism, ecology and genetics.
- BIOL-31 Objective 2: Describe the role of human action and genetic change on emerging microbial problems (emerging diseases, and antibiotic resistance).
- BIOL-31 Objective 3: Diagram and understand the steps involved in microbial metabolism including sample metabolic pathways with reactants, intermediates, and products,
- BIOL-31 Objective 4: Identify, locate, summarize, and utilize scholarly and quality information on microbiological topic(s) to produce written reports, term papers, and/or oral presentation.
- BIOL-31 Objective 5: Develop and utilize critical thinking and the scientific method while designing, performing, collecting data, and analyzing data from laboratory experiments.
- BIOL-31 Objective 6: Develop technical and practical manual dexterity skills associated with operation of technical laboratory equipment.

- BIOL-31 Objective 7: Describe the components of the host-microbe interactions including; the role of microbes in health and disease as well as the immunological response mechanisms.
- BIOL-31 Objective 8: Understand how the anatomy of microbes affects their growth, survival and the effect of antimicrobial compounds.

CSLOs:

- BIOL-31 SLO1: Compare and contrast the characteristics of major classes of microorganisms (bacteria, prions, viruses, protozoa, and multicellular parasites).
- BIOL-31 SLO2: Demonstrate the principles of operation of laboratory equipment for observation, sterilization, disinfection, and aseptic transfer of microorganisms.
- BIOL-31 SLO3: Outline and connect the mechanisms of infection in human body systems, and the role of the immune system, and commensal microbes in prevention and recovery from infection.
- BIOL-31 SLO4: Perform, design and implement laboratory experiments which hone critical thinking skills, by requiring data collection and result interpretation.
- BIOL-31 SLO5: Retrieve, evaluate, interpret and summarize scholarly and quality information related to microbiological concepts to produce written reports, term paper, and/or oral presentation.
- BIOL-31 SLO6: Describe how genetic change, together with selective pressure, can lead to emerging microbial problems.
- BIOL-31 SLO7: Identify bacteria species based on their biochemical characteristics, and 16s rRNA sequencing.
- BIOL-31 SLO8: Describe how microbial structures and antigenic drift can result in varied effectiveness of the immune system, and antimicrobial drugs.

Required Materials

- Openstax Microbiology available free at <https://openstax.org/details/books/microbiology> (or as a print copy if you want to buy one) **OR** Tortora, Gerard J. et al., Microbiology, 13th Edition, 2018. Benjamin Cummings Publishing Company with NO ACCESS CODES, etc.
- White Laboratory Coat
- Masks
- Microscope slides (you can share a box/pair)

Technology Requirements

- Many files and materials will be available through the learning management system Canvas. All students must have access to a device with internet access to that allows students to retrieve and complete assignments through Canvas.
- Check Canvas and your Reedley College email accounts regularly (multiple times per week) for announcements.

Attendance and Drop/Add Policy

You are expected to attend class as instructed (unless circumstances prevent this... in which case, you must discuss and make arrangements with me individually). Failure to attend class can result in reduction in course grade. Note: There are NO excused absences except as defined in the Reedley College Catalog.

During the early term of the course, students may be dropped for inactivity in the course. To avoid being dropped from this class, you must complete the following tasks:

- Web/Online requirements: The following tasks must be completed on Canvas by the end of the day on Wednesday of week 1 (1/11/23 @11:59PM)
 1. Complete the Syllabus Quiz
 2. Participate in the Check-In: Meet & Greet Discussion Board
 3. Complete extra credit survey of prior micro knowledge

Failure to complete ALL the tasks listed above, will result in a student being dropped from this course after the first week of instruction.

If you miss more than 3 weeks of class by the end of the semester, your final grade will be lowered by one letter grade. For example, if you earned an A but didn't attend for 3 week your final grade will be a B. If

you miss more than 5 weeks of class in the semester, your grade will be lowered by two letter grades. For example, if you earned an A but missed 5 weeks of zoom class, your final grade will be a C. If you miss more than 7 weeks in the semester you will fail the class, no questions asked.

Expectations and Policies:

- Be respectful and discipline yourself so others don't have to.
- No makeups are possible this semester.
- Cheating and plagiarism will result in failing the assignment and discussed further with administration.
- Please keep electronic devices silent and electronics of any kind are not permitted during exams.
- No food or drink in the trash cans in the lab.
- I will do my best, I expect you to do the same.

COVID-19 Related Safety Clauses and Information:

As of the writing of this syllabus (01/06/22), this course is scheduled to meet in person. However, I reserve the right to move this course back to fully online if deemed necessary following increases in prevalence of COVID-19 cases (or similar epidemic/pandemic situations), or at the advice of local, state and/or federal public health policies.

Syllabus schedule is subject to change.

Mask Policy: students are encouraged to wear a mask in the laboratory classroom. If you do not have a mask on, there are organisms which you **CANNOT** interact with in any way. These organisms are identified by a higher biosafety level (BSL-2).

Temperature Checks: Should locally rates of disease enter levels of widespread disease incidence, strongly encouraged temperature checks will be available as you enter the classroom. Unless these mandated by local agencies, these are optional and no student is required to have their temperature checked, but this is strongly encouraged.

Cleaning: Students will be expected to clean up appropriately in the laboratory.

Sick, have COVID symptoms, or COVID-19 positive?: DO NOT COME TO CLASS! SEND ME AN EMAIL AND WE CAN DISCUSS AND ARRANGE SOLUTIONS AS NEEDED... AGAIN, DO NOT COME TO CLASS SICK

Late Assignments and Makeups

No late assignments will be accepted **EVER**. NO EXCEPTIONS. Late/makeup exams will only be given except in the most extreme of situations and only with explicit approval from your instructor... me. If an extenuating circumstance arises that is beyond the realm of your control, let me know and we can discuss. However, you **MUST** alert me of any situation at least 3 hours before the exam time.

Tests and Evaluations

| <u>Description</u> | <u>Possible Points</u> |
|--|------------------------|
| 3 Lecture Exams (100 points each) | 300 |
| 1 Final Exam (Cumulative) | 150 |
| 2 Laboratory Assessments (150 points each) | 300 |
| 1 Unknown Laboratory | 30 |
| Lab Reports (as assigned) | 150 |

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| 16 Case Studies (3pts each) | 50 |
| 3 Reading Assignments (10pts each) | 30 |
| Misc. Activities/Assignments and Quizzes | 50 |
| 1 Term Paper/Presentation | <u>150</u> |
| Total points | 1,200 |
| Extra Credit (see VII below) | Maximum of: 25 |

To calculate your grade, total all points earned and divide that number by the total points available (1,200). **Course grades are non-negotiable; Instructor reserves the right to curve individual tests and/or assignments. FINAL GRADES WILL NOT BE CURVED... ALSO, I DO NOT round up your grades to the next letter grade.**

The final course grade is based on:

| Percent Range | Grade |
|---------------|-------|
| 90-100 | A |
| 80-89.99 | B |
| 70-79.99 | C |
| 60-69.99 | D |
| Less than 60 | F |

Lecture exams may be any combination of multiple-choice, true-false, matching, short-answer and essay questions based on the main objectives of each chapter. Please also remember... If I can't read it, I can't grade it! Write neatly! Lecture Exam 1 will be online, assuming there are no issues of academic integrity (as determined by me), I will allow the class to vote on continued online lecture exams, or will move them to in person. If there are any issues of academic integrity across the course in lecture exam 1, all exams will become in person, and proctored.

Misc activities and attendance may be attending zoom sessions, posting on check in board, and/or completing small activities.

Lab assessments will be practical based on the work done in the laboratory. They may include multiple choice, true-false, matching, essay and short answer questions. Each assessment will also include a physical demonstration of laboratory techniques. Note, the technique portion must be completed in class on the day of the exam and cannot be made up under any circumstances.

Lecture final exam will be comprehensive. Since this course is a prerequisite for all other Biology classes, and professional health programmes it is important that you retain as much knowledge as possible from this course to ease your way in the following semesters.

Case Study/Term Paper will be assigned in the 5th week of class. At this time, the class will select a topic for presentation from the list of approved microorganisms. At the conclusion of the semester, each student will record and submit a 10–15-minute presentation to the class describing their microorganism, and a formal written report must be submitted. Specific directions will be provided online.

Extra Credit At the discretion of the instructor extra credit MAY be available at intermittent points in the term, if you feel you have a borderline grade this is the only opportunity for grade increases. In the past, extra credit has included, reflection papers, exam reviews.

**** I reserve the right to make changes in this syllabus with notification ****

Laboratory Conduct:

- Students are to maintain clean areas at all times. Keep unnecessary books, papers, purses, etc., off the laboratory tables.
- Disinfectant laboratory tables at the beginning and at the end of every lab period.
- Aseptic techniques are to be followed at all times.

- D. Lab coats are to be worn in the lab at all times. Students with long hair must keep it contained with pins, clips, headbands, or rubber bands, etc. so that it will not sweep across desks, Bunsen burners, and/or microscopes. Legs are to be covered at all times. Close toed-shoes and socks are to be worn at all times.(Please wear pants/shoes without holes in them... holes don't protect from spills)
- E. Caution must be exercised in handling stains and other reagents, as they may be harmful to clothing, skin, eyes, floor, etc. Safety glasses must be worn when handling and using caustic or other dangerous chemicals. They are available in the classroom.
- F. Any spills of living organisms must be reported to your instructor immediately! Should a spill occur and not be reported immediately, these are grounds for removal from the class.
- G. If you spill on anything, bags, jackets, shoes, accessories, it WILL go into the autoclave for sterilization (and could be destroyed).
- H. Food and drinks are NOT allowed in the laboratory! NEVER eat or drink in the laboratory and avoid putting any objects in your mouth. Some organisms used in class are potentially pathogenic or are pathogenic.
- I. Wash your hands thoroughly and dry them before you leave the laboratory.
- J. Adhere to the Reedley Community College rules of student dress and conduct.
- K. Masks must be worn when working with any potential pathogenic organism.

IF YOU ARE UNDER THE AGE OF 18, YOU MUST HAVE A PARENT/GUARDIAN SIGNED CONSENT FORM TO WORK IN THE MICROBIOLOGY COURSE. YOU WILL NOT BE ALLOWED AROUND ANY MICROORGANISMS AND WILL BE DROPPED FROM THE COURSE IF THIS IS NOT COMPLETED

Communication Policy

The best way to get ahold of me is to email me at andrew.strankman@reedleycollege.edu or by sending me a direct message through canvas. Don't know how to send a message in canvas? Check out this quick guide [How to send a message in canvas](#).

- Please allow for a 24-48hr response time. I am very prompt with my email responses (I promise), however, there are times when it may take me up to 48hrs to respond. If you do not receive a response from me after 24hrs then please double check that you have the correct email address and resend. Most likely, I didn't get it if I didn't respond quickly.
- Emailing and messaging can be used 24/7. If I expect to be away from my computer for any significant length of time, you will be notified in advance. But please remember, I am human, and not always at the ready to respond.
- I do not reply to any emails on Saturday... this is my one day of no contact, do not expect a response on this day...as I won't be checking emails!

Office Hours

For Fall 2022, office hours will be a mix of online and in person... please see my schedule card (online or posted outside of my office for details) If you would like to meet with me outside of these office hours, please email me to arrange an appointment to meet. My virtual office hours are held through zoom and/or canvas messaging. You can expect an immediate response during this time frame if you message me. However, do note, if I am talking one-on-one with a student, you may have to wait outside, or in the waiting room if the discussion involves sensitive topics (grades, etc).

Canvas

All lecture and lab handouts, lecture notes, course schedules, and announcements are available at <https://scccd.instructure.com/login/ldap>. Your user name and password will be discussed in class.

Course Policies

Professional Behavior: You are an adult, act like it. If you act in a manner deemed inappropriate by the instructor, you will be removed from the course.

Children In Class: I love kids! Just please don't bring them into the lab... its not safe for anyone under

18 in the micro lab. If you are under 18, you will need signed consent to be in the lab, and will be prohibited from working with certain microbes.

Dress code: Pants, always pants, and closed toed shoes without holes in them. You will wear labcoats in the classroom, be sure they button up and are appropriate sized.

Grade Disputes: You have two weeks to discuss/dispute a grade once it is posted on Canvas. This includes any documentation of medical/ legal issues that may have prevented you from completing the assignment/ test. After that point, grades are FINAL. Notable exceptions are any assignment due/graded less than 2 weeks prior to the end of the semester... these must be discussed immediately.

Drops: You have until the end of the 9th week to drop the class. If you elect to do so, drop yourself. Do not assume you have automatically been dropped. After the 9th week you must be assigned a grade by state law, whether you attend class or not. Students are responsible for understanding the policies and procedures about the adding/dropping of classes, academic renewals, etc.

Plagiarism Detection: The campus subscribes to Turnitin plagiarism prevention service through Canvas, and you will need to submit written assignments to Turnitin. Student work will be used for plagiarism detection and for no other purpose.

Tutoring: Tutors are available in the tutorial center. If you have not had a biology class since high school, working with a tutor will get you up to speed. The tutors are former students who know how to study for the class. "With this statement on my course syllabus, I am referring each of my enrolled students in need of academic support to tutorial services. Referral reason: Mastering the content, study skills, and basic skills of this course is aided by the use of trained peer tutors".

College Policies

The university has several policies that you will be expected to adhere to in my course. The **Policy on Students with Disabilities, the University Honor Code, the Policy on Cheating and Plagiarism, a statement on copyright, and the university computer requirement**, portions of which are below, can all be found in the University Catalog (Policies and Regulations) and Class Schedule.

"Students at the Reedley College are entitled to the best education that the college can make available to them, and they, their instructors, and their fellow students share responsibility for seeing that their education is honestly attained. Because cheating, plagiarism, and collusion in dishonest activities erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences." Reedley College Catalog pg. 45 o Please see Disciplinary Procedures in the Student Conduct Standards and Grievance Procedures Handbook available in the Vice-President of Student Services office, or at the link listed below. For a comprehensive list of Student Conduct Standards, see: <http://reedleycollege.edu/index.aspx?page=233>

If you have a verified need for an academic accommodation or materials in alternate media (e.g. Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the instructor as soon as possible.

Cheating and Plagiarism:

I DO NOT TOLERATE CHEATING. PERIOD. Most of you are entering into the health care field and could harm or seriously injure other human beings if you do not know the basic information in this course.

Any student caught cheating or plagiarizing will be subject to the Reedley College disciplinary procedures (review the Reedley College catalog section on academic dishonesty). Electronics of any kind are not permitted during exams and will result in an automatic zero for that exam. Use of AI to assist/write or support with writing of any assignment (including term papers) will result in failing the course outright.

Accommodations:

I am 1000% on your side in supporting you to be successful in this class and beyond.... If you have any needs for accommodation in the class, please don't be shy, let me know, and we can talk to make it work! Accommodations are meant to equitably support the success of students, always make sure you let me know what you need, and how I can help. Also, don't be afraid to remind me if you think I might forget something related to you specifically.

Students with diagnosed disabilities should contact the Disabled Students Programs and Services' (DSP&S). Please give me a copy of the letter you receive from DSP&S detailing class accommodations you may need. If you require accommodation for test-taking please make sure I have the letter no less than three days before the test. If you have a need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

If you require testing outside of the classroom, we may need to discuss logistics for laboratory assessments as these often must be set up in the lab.

Tentative Schedule

Please bring your textbook to lecture and your textbook and lab manual to every lab. This is very important! Schedule is subject to change with notification from instructor.

| Week | Dates | Lecture (Book Chapter) | Laboratory Experiments |
|------|---------------|---|--|
| 1 | 01/09 – 01/13 | Introduction, and Syllabus Chapter 1 | Lab 1: Introduction to Microscopy, Safety and Culturing |
| 2 | 01/16 - 01/20 | Chapter 2 and Chapter 3 | Lab 2: Staining: Simple Stains |
| 3 | 01/23 – 01/27 | Chapter 9 and Chapter 13 | Lab 3: Staining: Differential Stains |
| 4 | 01/30 – 02/03 | Lecture Exam 1 | Lab 4: Morphologic Unknown and Media Making |
| 5 | 02/06 – 02/10 | Chapter 7 | Lab 5: Bacterial Growth, Culturing and Ubiquity of Life |
| 6 | 02/13 – 02/17 | Chapter 8 | Lab 6: Isolating and Differentiating Medically Relevant Microbes: Special Medias |
| 7 | 02/20 – 02/24 | Chapter 10 and Chapter 11 | Lab 7: Isolating and Differentiating Medically Relevant Microbes: Macromolecule Tests and Biochems |
| 8 | 02/27 – 03/03 | Chapter 4 Lecture Exam 2 | Lab 8: Environmental Effects on Microbial Growth |
| 9 | 03/06 – 03/10 | Chapter 5 (Fungi) | Lab 9: Serial Dilutions and Dilution Problems Lab Exam 1: Labs 1-7 (Thursday) |
| 10 | 03/13 – 03/17 | Chapter 6 | Lab 10: Exoenzymes |
| 11 | 03/20 – 03/24 | Chapter 16 | Lab 11: Enteric Microbe Determination |
| 12 | 03/27 – 03/31 | Lecture Exam 3 Chapter 15 | Lab 13: Eukaryotic Microbes Rough Draft Term Paper Due (Sunday 11:59) |
| 13 | 04/03 – 04/07 | Spring Break | Spring Break |
| 14 | 04/10 – 04/14 | Chapter 17 and Chapter 18 | Lab 14: Microbiota and Bioinformatics |
| 15 | 04/17 – 04/21 | Chapter 18 and Chapter 14 | Lab 15: Unknown Microbe Determination Final Draft Term Paper Due (Sunday 11:59pm) |
| 16 | 04/24 – 04/28 | Diseases of Skin and Eyes Diseases of the Nervous System | Lab 15: Unknown Microbe Determination Lab Exam 2: Labs 8-14 (Tuesday) |

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| 17 | 05/01-05/05 | Diseases of the Cardiovascular System Diseases of the Respiratory System | Lab 15: Unknown Microbe Determination |
| 18 | 05/08 - 05/12 | Diseases of the Digestive System Diseases of the Urinary and Reproductive System | Lab 15: Unknown Microbe Determination |
| 19 | 05/15- 05/19 | Final Exam Review Final Exam | No Labs |

Important Dates

Late Registration with Authorization Code 1/9-1/29

Drop w/Refund for full-term 18-week classes 1/20

Add w/Authorization Code and Drop w/o 'W' – in person, online or via email 1/28

Apply for Diploma or Certificate Deadline* 3/1

Drop w/ 'W' in person, online, or via email 3/10

Spring Semester Ends Grades expected to be on WebAdvisor 5/19