DISCLAIMER: This is an example syllabus that is subject to change at faculty discretion.

Course Syllabus

Course Information

BIO-348

Microbiology

4 Credit Hours

Online, Asynchronous

Instructor Information

Instructor Name

Email Address:

If you need to contact me directly, I prefer that you email me. Please allow 24 hours for me to respond to emails Monday through Friday and 48 hours on the weekend.

Communicating With the Instructor

When questions arise throughout the course, please remember to check the following resources for an answer before reaching out to me:

1. Course Syllabus
2. Announcements
3. The Question Center discussion board

Question Center Discussion

The Question Center Discussion is an excellent place to ask questions and get answers from peers and me. You are encouraged to post your questions here before contacting me unless it is a time-sensitive matter. If you have questions of a personal nature, such as relating to a personal emergency, questioning a grade on an assignment, or something else that needs to be communicated privately, you are welcome to contact me directly via email or phone.

Technology Help

If you have a question about the technology used in the course, please contact the Doane University Service Center for assistance; their contact information is listed later in the syllabus. If third-party tools are utilized in the course, please contact them directly.

Course Details

Catalog Description

Microbiology introduces the student to the structure and function of prokaryotic life forms and relevant eukaryotic microbes. Topics addressed include diversity in habitat and metabolic capabilities, historical and current impacts (both positive and negative) on humans and human society, and control and evolution of medically relevant forms. Upon completion of this course, students will be competent in handling microorganisms in lab, understand the importance of microbes to the human state, understand how the metabolic diversity of microbes impacts the earth in its current form, understand that evolution is a central concept in biology, a concept that includes biodiversity, adaptability, change, survival, and mutagenesis, and how evolution fits into a study of microbiology.

Course Prerequisites

Must have a C- or better in BIO 110, BIO 111, and BIO 212, or permission.

Course Textbook and Materials

Course books are delivered electronically and integrated into the course. If you require a physical textbook, please reach out bookstore@doane.edu.

Required Textbook

Nester's Microbiology, A Human Perspective

Denise G. Anderson, 10th edition, 2024

978-1264896905

Course Lab Kits

This course utilizes a lab kit from our educational partner, ***Science Interactive***. You will be required to complete both virtual and hands-on lab activities. The course includes instructions on how to order the voucher for the lab kit.

For any lab assignment that includes questions requiring photo evidence, students must upload their own original photos as instructed.

Failure to include the required photo evidence will result in a zero for the entire lab assignment, regardless of whether the rest of the questions are completed.

Required Technology

Canvas

YuJa Verity extension (Download requires Google Chrome (preferred), Opera, Microsoft Edge, or Brave

Science Interactive

McGraw-Hill Connect

Learning Objectives and Course Outline

Course Objectives

By the end of the course, you will be able to:

1. Develop an understanding and appreciation for the vast size and diversity of the microbial realm. This includes distinguishing bacteria, archaea, eukaryotic microbes, and viruses
2. Compare microbial organisms based on biochemical, genetic, and morphological characteristics
3. Identify, explain, and communicate positive and negative impacts microbes have on the functions of eukaryotes at the physiological and community level
4. Develop and employ essential microbiological laboratory techniques to explore phenomenon both in the lab and in the environment
5. Understand that the processes that generate energy in microbes are often complex despite the relative simplicity of microbial genomes
6. Describe how evolution occurs in microbes and how multicellular organisms relate to microbes evolutionarily
7. Gain an appreciation for how microbiology applies to a wide swath of careers in biology and gain an understanding of how different professions interact with microbes

Course Outline

Module	Topic	Assessments & Activities	Aligned Objectives
1	Introduction to Microbiology	Self-Introduction Discussion Adaptive Learning Assignment Case Study Quiz Labs • Getting Started • Lab Safety • Using the V-Scope • Microbiology Laboratory Prep • Lab Kit Inventory • Introduction- Microbiology- Rules for Success	1. Identify multiple professions using microbiology 2. Describe Pasteur's experiment disproving spontaneous generation 3. Outline at least four beneficial activities of microorganisms 4. Name the three domains of life and identify examples of environments where each domain can be found 5. Articulate the similarities and differences regarding the structure and function of the major groups of microorganisms, including eukaryotes, prokaryotes (bacteria and archaea), and viruses 6. Summarize taxonomic hierarchy, and the binomial nomenclature system 7. Describe why defining a species can be challenging for prokaryotic organisms 8. Explain what 16S rRNA is, and why 16S rRNA sequence analysis is the method now preferentially used for bacterial classification

Module	Topic	Assessments & Activities	Aligned Objectives
2	Tools of the Laboratory	Adaptive Learning Assignment Short Answer Assignment Quiz Lab: Microorganisms, Aseptic Technique, and Cultures	1. Describe the three physical states of media and their applications 2. Discuss the relationship between contrast and staining in microscopy. 3. Review the different types of microscopes 4. Correctly label the parts of the compound light microscope, and describe the general features of bright field microscopy 5. Define total magnification and resolution; list and explain two factors that determine resolving power 6. Compare the Simple Stains, Differential Stains, and Special Stains, giving an example of each. 7. Describe the uses of acidic and basic dyes, mentioning ionic bonding and pH 8. Discuss the distinctive structural and functional characteristics of cell walls 9. Compare and contrast Gram-

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3	Bacterial Structures and Metabolism	Adaptive Learning Assignment Dichotomous Key Construction Assignment Quiz Lab: Bacteria Morphology and Staining Techniques	1. Describe common shapes and arrangements of bacterial cells 2. Discuss the distinctive structural and functional characteristics of the following prokaryotic anatomical features, offering a contrast to similar structures in eukaryotes, where relevant a. the activity of ribosomes b. the presence of endospores, c. flagella d. pili and fimbriae e. organization of chromosomes 3. Describe the relationship among the terms metabolism, catabolism, and anabolism 4. Identify the components of an enzyme and the significance of its specificity 5. Explain the function of fermentation and highlight the significance of its common end products 6. List biochemical tests for metabolic enzymes and describe how their products are used in the identification of bacteria

Module	Topic	Assessments & Activities	Aligned Objectives
4	Dynamics of Microbial Growth	Adaptive Learning Assignment Quiz Midterm Exam Lab: Enumeration, Dilution, and Plate Counts	1. List the essential macronutrient needs of a bacterial cell 2. Compare basic categories of organisms based on their carbon and energy sources 3. Classify microbes based on preferred temperature range 4. Summarize the steps of binary fission 5. Define generation time, its correlation to exponential growth, and use an equation to estimate the number of cells in a given culture based on generation time, growth time, and number of cells used to start a culture 6. Outline the features of the four phases of a normal growth curve, describing the cellular activities at each phase 7. List other methods of analyzing

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5	Microbial Life in Communities	Adaptive Learning Assignment Diagnostic and Therapeutic Potential of the Gut Microbiome Discussion Quiz Lab: Kirby-Bauer Diffusion for Antibiotic Effectiveness	1. Describe what a biofilm is 2. Differentiate between planktonic and sessile cells 3. Summarize the five stages of biofilm formation 4. Explain how the bacterial glycocalyx, extracellular polymeric substance (EPS), contributes to biofilm formation 5. Describe the role of quorum sensing in the establishment and changes in gene expression in a biofilm 6. Explain how biofilms often pose a hazard in healthcare facilities 7. Distinguish among the types of symbiosis and identify the type of relationship when given a scenario 8. Describe the microbiome, including resident and transient members 9. Explain ways that the overuse of antibiotics can disrupt the balance of the gut microbiome, and how this dysbiosis can impact overall health 10. Define biogeochemical cycle 11. Outline the carbon and nitrogen cycles, and explain the

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6	Bacterial Genetics and Viruses	Adaptive Learning Assignment Operon Model Video Assignment Quiz Lab: Microorganisms as Vectors of Disease	1. Summarize how bacterial and eukaryotic cells differ in transcription and translation 2. Explain the role of plasmids and transposons in genetic change in prokaryotes 3. Explain what an operon is (both repressible and inducible) and describe how this process increases the efficiency of gene expression in prokaryotes, using the lac and trp operon as examples 4. List the three primary mechanisms of Horizontal Gene Transfer 5. Describe the process of bacterial transformation, including the role of competent cells 6. List the general properties of viruses 7. Describe the basic morphological features and functions of viral structures, including capsids, envelopes, and spikes 8. Discuss the Baltimore Classification and how each type of genome creates mRNA 9. Summarize the conventions for naming viruses 10. Explain the

Module	Topic	Assessments & Activities	Aligned Objectives
7	Mechanisms of Microbial Establishment and Control	Adaptive Learning Assignment Antibiogram Assignment Quiz Labs: Environmental Influences on Microbial Growth – Salinity Testing	1. Differentiate among the terms colonization, infection, and disease 2. List Koch's postulates, and compare them to the molecular Koch's postulates, and explain an exception to each Koch's postulates 3. Differentiate between a microbe's pathogenicity and its virulence 4. Define the following terms related to microbial control: sterilization, disinfection, antisepsis, and decontamination 5. List of factors to consider in selecting a microbial control method 6. Name five methods of physical control of microorganisms 7. Compare the action of microbicidal and microbistatic agents, providing an example of each 8. Identify the desirable characteristics of chemical control agents 9. Name four categories of cellular targets for physical and chemical agents 10. Identify sources of the most used antimicrobial drugs 11. Identify five modes

Module	Topic	Assessments & Activities	Aligned Objectives
8	Microbial Ecology In The Environment And The Human Body	Adaptive Learning Assignment Quiz Final Exam	1. Define bioremediation, and how biostimulation can be used in the remediation of oil spills 2. Explain how Coliforms are used as indicator organisms in the sanitary analysis of waters to be deemed potable 3. Outline the microbial succession that occurs as unpasteurized milk spoils 4. Explain soil as a microbial habitat 5. Cite at least three characteristics that distinguish fungi from other groups of eukaryotes 6. Explain what a dikaryotic stage is and describe the lifecycle of an ascomycete 7. Define what a protist is. List three characteristics shared by all protozoa 8. List three means of locomotion exhibited by protozoa, and provide an example of each 9. Outline the general life cycle exhibited by a member of the genus Plasmodium, involving the different stages in the different host 10. Compare and contrast adaptive and innate immunity

Course Requirements

This is an online course, and there will **not be any face-to-face class sessions**. All communications, submissions of assignments, course interactions, and posting of grades will utilize Canvas LMS (https://doane.instructure.com). You must have a **reliable internet connection** throughout the course.

Attendance/Participation

Attendance in an online course means logging into Canvas regularly and participating in all the activities posted in the course. In addition, check your Doane University email account regularly, as I may send important information about the course.

Doane University expects active participation by a student in a course, whether the course is on-ground or online. A student is expected to be prompt and regularly attend on-ground classes in their entirety. Regular engagement is expected for online courses.

You are required to have an active Doane University e-mail account. All communication from the instructor will be to your Doane University e-mail account or via canvas messaging (accessed at doane.instructure.com). Please, check your Doane University e-mail account daily, as your instructor may send important information via email.

Yuja Verity is Doane University's proctoring system. It will be used in your course to proctor exams. Additionally, you will be required to complete a quiz through Yuja Verity at the beginning of the course to verify your identity. Once you complete this quiz, you may begin your course. You will have four proctored quizzes in this course, which are not optional, and monitors the participant's activity and suspicious events will be reported.

Class Preparation

Preparation for class means reading the assigned readings and reviewing all information required for that module. You should plan to work on this course every day. Regular engagement is expected for online courses.

Netiquette Guidelines

At heart, netiquette (etiquette for the Internet) is simple, including good manners and business courtesy. Some of it may seem basic, but some infringements can result in major problems for others or create an unintended insult to another user. The guidelines are adapted from Virginia Shea's *The Core Rules of Netiquette* (1994). Please review the Netiquette Guidelines in the Student Resource Center for more information.

Computer Requirements

To successfully use Canvas, please refer to Doane University's minimum computer requirements. This also includes:

- Reliable computer and internet connection

- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader (free)
- Word processing software—Microsoft Word or Google Docs
- Webcam and mic*

*A webcam is optional for privacy purposes during video conferencing and recording.

Campus Network or Canvas Outage

When access to Canvas is not available for an extended period of time (greater than one entire evening - 6 pm until 11 pm), you can reasonably expect that the due date for assignments will be changed to the next day.

Drop and Add Dates

If you feel it is necessary to withdraw from the course, please contact your University Advisor or the Open Learning Academy at ola@doane.edu or (402) 467-9008 for full details on the types of withdrawals that are available and their procedures. You can also review important refund and withdrawal dates via the Academic Calendar for OPENING LEARNING ACADEMY.

Federal requirements state that students must complete 75% of the coursework to be eligible to receive an incomplete for the course. Students who fall more than two weeks behind cannot meet this requirement.

Access to Course

You can access the course in Canvas starting from the first day of the course and for 15 days after the term ends. If you need access beyond those 15 days, you must submit a request with a valid reason, which the administration must approve.

Academic Integrity

Fundamental to our mission, core values, and reputation, Doane University adheres to high academic standards. Students of Doane University are expected to conduct themselves in a manner reflecting personal and professional integrity. Disciplinary actions may be taken against students whose academic behavior is not congruent with the expectations of the University. Students are responsible for adhering to the standards detailed in this policy. Not being familiar with these standards does not mean that the students will not be accountable for adherence to them. Additional details on the Academic Integrity policy for violating academic integrity are published in the undergraduate and graduate catalogs. Please review Doane University's Academic Integrity Policy.

Use of Artificial Intelligence (AI)

The use of AI tools (e.g., ChatGPT, Copilot, etc.) is permitted for research purposes only. All submitted work must be entirely authored by the student. Using AI to generate or complete assignments, answers, or assessments is strictly prohibited and will be considered a violation

of academic integrity. Students are expected to engage with course material authentically and demonstrate their own understanding through original work.

Course Grading

Submitting Assignments

Unless otherwise communicated to me, all assignments must be submitted via Canvas. Each assignment will have a designated place to submit your work. It is your responsibility to submit all the assignments in accordance with the format instructed in the prompt.All materials, assignments, and deadlines are subject to change without prior notice. You are responsible for staying in touch with me and reviewing the course site, including Announcements, regularly to learn about changes to assignments or due dates.

Grading Scale

Assignment of letter grades is based on a percentage of points earned. The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

A+ 100% to 96.5%
A < 96.5%to93.5%
A- < 93.5% to 89.5%
B+ < 89.5% to 86.5%
B < 86.5% to 83.5%
B- < 83.5% to 79.5%
C+ < 79.5% to 76.5%

C < 76.5% to 73.5%
C- < 73.5% to 69.5%
D+ < 69.5% to 66.5%
D < 66.5% to 63.5%
D- < 63.5% to 59.5%
F < 59.5% to 0%

Tutoring Services

Students can access a **free online tutoring service** within their Canvas account. You can connect with a live free tutor or submit a paper to get feedback before submitting.

Proctored Assessments

This course **may contain proctored quizzes and exams, which are not optional**. For these proctored events, Doane uses YuJa Verity, a secure, online proctoring service that allows you to complete your exam from any chosen location at any time. Proctoring assures your instructor that any suspicious activity by test takers will be monitored and reported. The cost of the proctoring is included in the tuition and fees for this course.

Late or Missed Assignments

All assignments must be completed by the due date and turned in to finish the course.Unless you discuss a late assignment with your instructor **PRIOR** to the assignment due date, your assignment will lose 20% (of the designated assignment grade) each day it is late. Unapproved late assignments will not be accepted for credit, and extensions will not be applied retroactively. Assignments submitted through email will not be accepted for grading and credit. Any late or missing assignments related to an illness must be accompanied by a valid and verifiable document from your medical provider before any accommodation can be made

Assignment & Assessment Feedback

Please allow 3-7 days for feedback on assignments once all participating students have submitted a response to a specific assignment. When an assignment falls short of what is required for a full grade I provide thorough feedback, and this interval enables me to review an assignment more than once, prior to issuing a fair grade. Please review the instructor feedback for assignments and assessments, as this will help you reflect on what you have learned while receiving suggestions for improvement. There is no extra credit offered in this course.

Grade Appeals

Students who believe that their grade was miscalculated due to a mathematical error should contact the instructor within **ten (10) days of the grade posting**. Students are encouraged to talk with their advisor to offer an assessment of the concern and clarify the steps of the appeal process. More information is published in the Undergraduate and Graduate Catalogs.

Support and Services

Technical Support

If you need technical assistance, please access the Self-Service Portal. The help desk can be reached at 402-826-8411 or by email at helpdesk@doane.edu.

Accessibility Statement

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with Disabilities Act of 1990, professional disability specialists and support staff at Doane University facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. Doane University staff coordinate student transitions from high schools and community colleges, conduct in-service training for faculty and staff, enable the resolution of accessibility issues, conduct community outreach, and facilitate collaboration among Doane University staff on disability policies, procedures, and accommodations.

Accommodations & Disability Services

Doane University's Disability Services Office will guide accommodations and universal access. To request accommodation, please complete the Self-Identification Form and visit the website for additional information as soon as possible.

Academic Support

Doane University offers all of its students access to Academic Support services.

Title IX Requirements: Mandatory Reporting

At Doane, all university employees, including faculty, are considered Mandatory Reporters. As a Mandatory Reporter, I am required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator and, thus, cannot guarantee confidentiality. This means that if you tell me about an incident of sexual harassment, sexual assault, domestic violence, dating violence, stalking, and/or other forms of prohibited discrimination, I have to share the information with the University's Title IX Coordinator. My report does not mean that you are officially reporting the incident. This process is in place to ensure you have access to and are able to receive the support and resources you need. Please visit the Campus Advocacy, Prevention, and Education (CAPE) Project for additional information, including confidential resources.

Anti-Harassment Policy

Doane University, referred to as the "University," is committed to providing all University community members with a safe and non-discriminatory learning, living, and working environment. This policy addresses the University's responsibilities under Title IX, the Violence Against Women Reauthorization Act of 2013, and the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act ("Clery Act"). More information is published in the Student Handbooks.

Instructional Technology Accessibility and Privacy Policies

Technology accessibility and privacy policies are available on the Student Resource Center within the Canvas LMS.

Regular and Substantive Interaction

The U.S. Department of Education mandates that online courses include "regular and substantive interaction" (RSI) between students and instructors to be considered distance education. This course adheres to the RSI expected of all distance education courses. The course adheres to the regular component through

- a clear schedule of due dates for lessons, readings, and assessments, and
- an instructor of record who monitors student progress in the course and alerts the students who are not engaging adequately in the course.

The substantive interaction is achieved through

- assessment of students' work with feedback on a scheduled basis
- an active discussion board about course content monitored by the instructor
- providing information about the course content on a regular basis or in response to questions.

Syllabus Addendum & Disclaimer

I (the instructor) view the course syllabus as an educational contract between myself and each student. Every effort will be made to avoid changing the course schedule, but unforeseen events may make syllabus changes necessary. I reserve the right to make changes to the syllabus as deemed necessary. Students will be notified promptly of any syllabus changes via email or course site announcements. Please check your Doane University email and the course site announcements often.

Syllabus Changes

The instructor and Doane University reserve the right to change this course syllabus. All students will be notified of any changes.

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Syllabus Addendum

Each student is responsible for knowing the policies, resources, and expectations specified in the Doane Syllabus Addendum.