

The Indiana Academy for Science, Mathematics, and Humanities  
**Introduction to Microbiology SCI04304**  
**Fall Semester 2021 (Dual Credit for BIO-113)**

**Instructor:** Mr. Michael Mayfield, [mmayfiel@bsu.edu](mailto:mmayfiel@bsu.edu)  
Office: WA 154 phone: 765-285-7408

**Office Hours:** see schedule posted on Canvas

**Classroom:** Lecture: MWF 1:00 p.m. in B-211 Lab: Tues. 2:00-4:00 p.m. (B-211)

*To accommodate student demand for the course while adhering to Covid classroom modifications, lectures and labs will be meeting in person in B211. Due to the nature of microbes, there will be times when cultures will be streaked on one day, then checked 24 hours later. Therefore, some lecture days might be used as lab days.*

*Occasionally there may be labs that take the full lab time. When that happens, students will work with lab partners. In preparation for the lab activity, students are expected to read the lab and/or view the accompanying video that introduces and summarizes the lab activity, so they can get started when they arrive in the classroom.*

*→ Please check your email regularly for important updates.*

**Texts:** *Microbiology* by Robert Bauman  
*Laboratory Applications in Microbiology* by Barry Chess

**Materials:** 3-ring binder (about 1 – 1.5 inches thick); Sharpie marker, colored pencils

***Please note: the most current version of this syllabus is posted on Canvas.***  
***Please refer to Canvas for accurate, updated information.***

**Course Description from the Catalog:**

“The history of bacterial discovery, the scope of bacterial effects, biotechnology, and the classification of micro-organisms are studied. The course includes the study of the structure, function, and ecology of microbes and viruses. Basic aseptic and sterile techniques for isolating, culturing, and identifying bacteria are discussed and practiced in the laboratory as a prelude to learning fundamental staining techniques, biochemical tests, etc. that are used in the identification of unknown bacteria. Some consideration is given to the medical concerns related to bacterial and viral pathogens.”

[\(http://www.bsu.edu/academy/catalog/\)](http://www.bsu.edu/academy/catalog/)

We will be using a case study approach for application of material. Whenever possible, microbes of medical, industrial, and environmental significance will be emphasized. Safety will be a primary concern of all participants in the course. We will spend much of our time in lab learning by doing. This is typically a very “hands on” course, modifications will be made to abide by any Covid restrictions in the classroom. Course material may be supplemented with interactive computer programs and handouts. As a result, reading the assigned material before coming to class is critical. Content and science skills will be centered around real-world case studies relating to microbiology, health, and current topics.

## Classroom Conduct:

Because we hold class in a science lab, no food, gum, or drinks can be brought into the classroom. Your work area should always be free of clutter and only have the necessary materials (pens/pencils, notebook, etc.). Please refer to **safety guidelines** for proper lab etiquette posted on Canvas (also see lab manual p. 1 – 7).

In order to provide the proper learning environment, you must be considerate of others in the classroom. Please turn OFF/silence all personal electronic devices (i.e. cell phones, computers if not being used for classroom purposes), while class is in session. Phones should remain in your book bag and silent.

It is unacceptable for you to disturb or disrespect others. Talking while I or someone else has the floor is rude and disrespectful. Conducting extended conversations, arriving late to class, working on assignments for other classes, sleeping, etc., are other examples of improper conduct. More serious and/or chronic problems may be cause for dismissal from the course. \*

Laptops are allowed in class for approved activities, but misuse for unauthorized activities will result in losing that privilege.

***Chronic infractions of this policy may result in loss of laptop privileges.*** All materials found on the Internet must be properly documented like any other source of information to avoid plagiarism which is a form of Academic Dishonesty. If you are unsure how to cite this information, please see Mr. Mayfield

## Academic Conduct:

You are responsible for preparing yourself before every class meeting. This includes reading the textbook sections pertaining to the present day's topic and/or activity, and having assignments completed and turned in at the beginning of class. Homework assignments can be turned in as a Word Doc or PDF uploaded onto E-mail; hand-written homework can be turned in during class, or a picture can be uploaded to s. ***Please note: although some activities (i.e. Labs) may be performed in groups/pairs, each student is expected to complete their own work by writing their own independent answers for each assignment and/or from the lab data collected in class. Do not share files with each other.*** Instead, make sure everyone in your group has the raw data to complete their lab assignments.

### Plagiarism:

You are expected to conduct yourself according to the Indiana Academy Student Code of Conduct. In particular, you should pay careful attention to the section on academic misconduct. Cheating and plagiarism are dishonest and will not be tolerated. Note that copying from a text without citation **is** plagiarism. Copying from another student, even with their permission, **is** plagiarism (cheating). Any such inappropriate behavior will result in penalties ranging from a "0" for the assignment. Please refer to the Student Code of Conduct: Part VIII. Student Academic Integrity. If an ethics violation occurs, instructors are required to report them regardless of the severity → this includes talking to your parents. Claiming that you did not understand the assignment, plagiarism or the academic ethics policy is not an acceptable excuse, so please be sure to ask Mr. Mayfield

### **Attendance and Late Work:**

You are expected to attend every class meeting. I will be taking attendance daily. If you are late to class, then you might receive a warning for the first time, but subsequent tardiness will be recorded as such. If you are more than 15 minutes late for lecture and 30 minutes late for lab, then these may be recorded as absences. Exceptions might be made for students with extenuating circumstances. Over-sleeping is NOT an acceptable excuse.

If you miss a lecture for any reason, it is your responsibility to get any information, announcements, and/or assignments that you missed. Most information can be accessed through Canvas, but any notes can be acquired from one of your classmates, and handouts not on Canvas may be obtained from me.

Due to the nature of the laboratory portion of the course, attendance for the laboratory is required. Many lab assignments and activities are performed in groups, so your participation is essential. All lab reports and assignments are to be written individually and independently, unless otherwise stated by the instructor.

In the event of an unavoidable emergency or illness, you should contact me as soon as possible. Any make-up work will be at the discretion of the instructor and completed within a week of your return. If you find that you are unable to take an exam on the scheduled dates, please contact me immediately before the exam if possible. For those with an Academy approved excuse, arrangements can be made on a case by case basis. Unexcused absences may not have the opportunity to make up work, or late penalties may be applied. Missing an exam due to an unexcused absence will result in a 20% penalty applied to the make-up exam.

Late assignments may have 10% penalty assessed for turning it in later. Once assignments have been graded and returned to the student body, late assignments will NOT be accepted and the score for the missing assignment will be recorded as "0". Exceptions might be made on a case-by-case basis for individuals with extenuating circumstances.

If you are absent for an exam, the exam MUST be made up within the week of your return. If you have an unexcused absence, then the exam will be treated as a late assignment and late penalties will be applied. In the rare event that a student misses another exam due to a second unexcused absence, then there will be no make-up of the exam and the score will be recorded as "0" for that exam.

→ Make-up work for pre-arranged absences should be negotiated with Mr. Mayfield in advance.

→ Unexcused absences – The instructor reserves the right to accept or not accept make-up work for unexcused absences as directed by Academy Handbook policy. Students may not have the ability to make-up any work that was missed and the grade will be recorded as "0" in Powerschool. For individuals with an Academy approved excuse, adjustments might be made on a case by case basis.

### **Assessment of the Course:**

Every member of the class will have the opportunity to evaluate the course lecture, laboratory, material and instructor. The evaluation will be administered towards the end of the term and will be anonymous. The results of the evaluation will not be made available to the instructor until after the end of the term. Course evaluations are used to strengthen the quality of the course and for evaluating faculty performance.

## Grading:

Your semester grade will be calculated using the following weighted average. I have designed this method of grade calculation to give you credit for all the work you do for class and not just base your grade on examinations and quizzes.

Examinations and Quizzes .....	50%
Lab Write-ups .....	25%
Assignments (Reports, Presentations, participation) .....	25%

***\*Note: Chronic Safety violations and/or disruptions may result in grade deductions and/or dismissal from course***

There will be three lecture/lab exams given during the course of the term. The approximate dates are given in the lecture/lab schedule. Each exam will be of equal weight (100 points). Students will take a comprehensive lab practical as part of a cumulative final exam during exam week (worth 100 pts).\*\*

Approximately once a week (except during exam weeks), quizzes might be given during the first 15 minutes of class. If you are late to class, the time will not be extended for you. For example, if you arrive 5 minutes late, you will only have the remaining 5 minutes left for the quiz. Quizzes will cover basic information from the previous 2 – 3 days of class material.

There are two or three projects: Controlling Microbial Growth experiment, Bacterial Unknown Identification project, and Food /Medical Microbiology presentation. The identification of an unknown bacterial species is the largest of the three and may take several weeks to complete. Please see schedule for timeline and due dates.

Because we are dealing with live organisms, safety in the laboratory is a high priority. Therefore, laboratory and classroom conduct will be observed and evaluated during the semester. Students are expected to be attentive and encouraged to actively participate – especially in the lab while working in groups. Positive behavior and attention to safety will be rewarded. **Unsafe and/or irresponsible behavior will result in loss of points and privileges\*.**

→You are also expected to organize a proper lab notebook using a 3-ring binder to keep it all together.\*\* More information on this in class. It will consist of 4 sections:

- Section 1: Reference Material (i.e. safety guidelines, microscope care, etc.)
- Section 2: Notes (can be kept digitally)
- Section 3: Laboratory (includes lab write-ups)
- Section 4: Miscellaneous (can include graded homework, quizzes, etc.)

**\*\* This may be altered depending upon Covid guidelines and the judgement of the instructor.**

### Grade Scale:

Your course grade and Dual Credit Grade will be determined as a percentage of earned points with weighted categories on the following scale:

A = 90– 100%	B = 80 – 86%	C = 68 – 75%
A- = 88 – 89%	B- = 77 – 80%	C- = 60 – 67%
B+ = 87 – 88%	C+ = 75 – 76%	D* < 60%

The final grades will be not curved. However, I reserve the right to “curve” individual examinations and quizzes based on my professional judgment of the material covered. To find out your current standing within the course, you should keep track of your grades in PowerSchool. I will do my best to keep the gradebook current and correct. Please check it regularly to help me make sure it is accurate, and notify me of any potential errors within 10 school days.

**Lab equipment breakage:\*** If there are glassware breakage or equipment problems, please notify the instructor immediately, to ensure proper safety and equipment protocols are followed.

### Indiana Academy Mask Policy:

**Requirement:** The Indiana Academy will follow [Ball State University's mask policy](#). Effective July 1, 2020, all people on campus—including faculty, staff, students, vendors, contractors, suppliers, and visitors—should wear face masks (covering nose and mouth) while inside campus buildings. Face masks are specifically required in the following situations:

- i. When in the presence of others (indoors) and physical distancing is difficult to maintain, such as in hallways, elevators, stairs, public spaces, and common areas;
- ii. When in a classroom or laboratory;
- iii. When using campus transportation (such as a shuttle bus);
- iv. When multiple individuals are in a University vehicle.
- v. Students, faculty, and staff are encouraged to bring their own mask. Masks will be provided to anyone who is unable to bring a mask or their mask is damaged.

**Special Circumstances:** If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building needs to be evacuated, please make an appointment with me as soon as possible.

If you are struggling with study habits, stress and/or personal issues, I encourage you to discuss this with your SLC and/or contact the Guidance Office for help in dealing with these issues so that you can thrive at the academy. Many resources are available to students and important contact information is listed below:

For Academic assistance: Guidance Counselor *phone:* 765-285-8108  
*office:* WA 160-B

For Tutoring: TBA ([iaguidance@bsu.edu](mailto:iaguidance@bsu.edu))  
*phone:* 765-285-2889 *office:* WA 160-D

Mental Health Therapist: Dr. Mindy Wallpe ([mcwallpe@bsu.edu](mailto:mcwallpe@bsu.edu))  
*phone:* 765-285-8130 *office:* WA 160-C

**BSU and IA commitment to Diversity:** Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge and through university resources found at <http://cms.bsu.edu/campuslife/multiculturalcenter>.

### Tentative Microbiology Schedule:

This syllabus has a tentative schedule/outline of course content and may be subject to change.

Week	Date	Topic	Chapter
1	8/16	Microbiology: Introduction	1
2		Cell Structure and Function (8/27 Safety Quiz)	3
3		Classification, Microscopy	4, 11
4		Chemistry	2
5		Prokaryotic Classification (9/17 Exam 1)	11
6		Microbial Growth (Micro Control Exp. Due Sept. 10)	6
7		Microbial Metabolism	5
8		Microbial Metabolism	5
9		Microbial Genetics (10/15 Exam 2)	7
10		Eukaryotic Classification (protists, fungi)	12
11		Viruses	13
12		Immunity (Unknown Report due Nov. 6)	15, 16
13		Pathogenic Bacteria (11/12 Exam 3)	19, 20
14		Epidemiology	14
15	11/20	<u>Thanksgiving – no classes</u>	
16		Applied/Environ. Microbiology	26
17		Food Microbiology (Food Presentations)	26
18	12/17	Last day of the semester	
		<b>(Final Exam?)</b>	

*I reserve the right to change the syllabus on an “as needed” basis. Students will be notified of these changes through e-mail and/or Canvas announcements.*

## Tentative Laboratory and Exam Schedule - Fall Semester 2020

Date	Laboratory Topics / Exercises
August 17	Ex. 1 Lab Safety; Ex. 6 Ubiquity of Microbes (Ex. 7 & 40) <sup>***</sup>
August 23	Ex. 2 Microscopy, Ex. 22 Epidemic
Sept. 30	Microbial Control (Ch. 9) Experiment (see Ex. 14, 15, & 18) Formal Lab Report <u>Due: Sept. 24</u>
September 7	Cell Morphology and Stains (Ex. 8 Gram, Ex. 10 Endospore, Ex. 11 Acid Fast)
September 14	<b>Exam 1: Chapters 1 – 4, 11:</b> Safety; Chemistry; Cell Structures and Function; Microscopy, Staining, and Classification; General Characteristics
September 21	Ex. 13 Microbial Growth Requirements (aerobic vs anaerobic) (media: Thioglycollate, O-F Glucose, Catalase) <sup>***</sup> ( <i>unknowns</i> – list of organisms, creation of flow chart) <b>Microbial Control Experiment Lab Report DUE</b>
October 5	Carbohydrate Metabolism (media: PR Broths, MR-VP, Starch) <sup>***</sup> (flow chart completed – <i>unknowns</i> distributed: Gram Stain)
October 12	Other Biochemical Media (SIM, Urea, Citrate, Nitrate) <sup>***</sup>
October 19	<b>Exam 2: Chapters 5, 6, 7, 11:</b>
October 26	Ex. 32 & 33 Detection of G+ pathogens (media: MSA, Catalase, Gelatin, Blood) <sup>***</sup>  Ex. 34 Enterobacteriaceae determination (TSI, Citrate, EMB, Mac) <sup>***</sup>
November 2	Ex. 20 Kirby-Bauer Antibiotic sensitivity <b>Unknown Report DUE Friday Nov. 6</b>
November 9	<b>Exam 3: Chapters 12, 13, 15, 16:</b>
November 16	Ex. 28 Water Quality MPN procedure (lactose broth tubes, EMB) <sup>***</sup>
Nov. 20-28	<i>Thanksgiving break - no classes or labs</i>
November 30	Ex. 4 & 5 Survey of Fungi & Parasites (Ch. 12, 22 & 23)
December 7	<b>Food Presentations</b>

*\*\*\*Biochemical test media descriptions can be found in the back half of the lab manual. You are responsible for knowing how these tests work, interpretations, and application.*