

# MICR 4990 - SPECIAL PROBLEMS IN MICROBIOLOGY

Fall 2023

---

**Instructor:** Dr. Reed Stubbendieck (he/him)  
**Email:** [stubbendieck@okstate.edu](mailto:stubbendieck@okstate.edu)

**Time:** variable  
**Place:** 310 Life Sciences East

---

**Course Description:** Training in independent work, study of relevant literature, and experimental investigation of assigned problems culminating in a written and/or oral report. Offered for variable credit, 1-3 credit hours. Expected: 4 hours of lab time per credit hour.

**Course Objective:** The objective of MICR 4990 is to offer a hands-on experience learning microbiology in an applied laboratory setting. Your instruction will be guided by myself, staff, and other students in the laboratory, but a significant degree of independent work is expected.

Research in the Stubbendieck Lab focuses on studying how bacteria synthesize and use secondary metabolites to mediate competition and cooperation within environmental and host-associated microbiomes. As part of this research program, you may receive training in microbiology, molecular biology, natural products chemistry, and/or computational biology depending on the specifics of your project. You may be given an independent project, but you may also be assigned to assist other members of the lab with their projects, depending on your availability and ability to conduct independent research.

**Prerequisites:** Permission from the instructor. Note: Permission is contingent on having a discussion with myself to establish hours, expectations, and outline requirements for the final written and/or oral report.

## Required Materials:

- Proper Personal Protective Equipment (PPE). This includes long pants and closed shoes. A lab coat and safety glasses will be provided by the lab. If you need any additional PPE, I will order it with no questions asked.
- OSU Lab Safety Manual. I will provide this.
- Lab Notebook. I will provide this.

**Office Hours:** By appointment.

**Response Time:** I aim to answer all emails from students in the lab received during working hours by the end of the day. I will respond to emails received over the weekend by the end of the day Monday. I expect the same from students in the lab.

**Research Expectations:** Conducting research is my primary role as a professor at Oklahoma State University. As part of this role, I have the privilege of working with and training bright and enthusiastic students, such as yourself. As part of your training, I believe that it is essential to have clear and realistic requirements. With that in mind, here is what I expect from undergraduate researchers in the lab:

1. I expect that you will comply with all lab policies. This is self-explanatory and enforced by the grading policies of this syllabus.
2. I expect that you will actively work toward research independence. While you can expect support and assistance as you learn, at some point you should anticipate being able to design and conduct experiments with minimal supervision. Becoming independent in the lab also means that you will be able to work at a faster pace and accomplish more.

3. I expect that you will schedule your work around the schedule of your mentors. While you are beginning your training in the laboratory, you should work with your direct mentor in the lab to determine your schedule. Until you are sufficiently trained and familiar with the lab, you should not work alone without supervision.
4. I expect that you will attend lab meetings if possible. You will learn a lot in lab, but you will also benefit from discussing science in a structured, yet casual, setting. While you are welcome to formally participate in meetings and present to the group, you are not required to do so unless you opt to do so for our final report/presentation. We will choose a time for lab meeting each semester that accommodates the majority of lab members.
5. I expect that your projects will reflect the time that you can put into the lab. Generating publishable data requires that you can be available on consecutive days. In research, you get back what you put in. If you are only available for non-consecutive days, then you can expect to assist another student, prepare media and other consumables, or complete other laboratory chores.
6. I expect your experiments to be planned in advance. The key to running a successful experiment is to have a plan. Before beginning an experiment, ensure that you have all of the necessary reagents and strains. Know your positive and negative controls. Allocate sufficient time to complete the experiment and interpret the results.
7. I expect that you will communicate openly and honestly with me. Communication is critical for your future success as a scientist or in any other career that you choose to pursue. If something isn't working, with respect to your project or anything else in the lab, please let me know. We can't work together to fix any issues if I am not aware there is a problem.
8. I expect that you will maintain integrity as a researcher. I have a zero tolerance policy towards research misconduct, including fabrication, falsification, and plagiarism. We will work together to maintain a lab culture that promotes morally and academically responsible research, while minimizing pressures that can promote research misconduct. Remember, it is okay to make mistakes, but it is not okay to cover them up.

**Your Expectations of Me:** In exchange for adhering to the expectations outlined above, you can expect me to ensure that you receive proper mentorship, clear feedback about your work, support in your scientific and future endeavors, and opportunity to work in a safe and collegiate environment. As long as my door is open, you can feel free to drop in and discuss your project, career advice, future plans, or anything else on your mind. It is my pleasure to help you develop professionally in any way that I can.

### **Grading:**

Attendance is an overall grade based on putting in the requisite hours for your research credit. This will be determined based on the number of credits that you are signed up for, where 1 credit hour is equivalent to 4 hours in the lab. You are required to put your hours in the lab calendar and to adhere to those hours. If you need to change your hours for any reason, please give me or your direct mentor in the lab 24 hours notice. In the event of illness, inclement weather, or another unforeseen circumstance, please contact myself or your direct mentor as soon as possible. I expect that you will make up any missed hours at a later time. If you are consistently unable to make your hours, then I will ask you to withdraw from this course to avoid receiving a failing grade.

Certification is an overall grade based on completing the training required to work in the lab. Training includes certification through the CITI program and Bloodborne Pathogens Training. I will send you details on how to enroll in these training programs.

Safety is an overall grade based on your commitment to conducting your research in a responsible manner.

Proper PPE is required at all times and you are expected to help maintain lab cleanliness. We have limited space in the lab and must share with other lab members. This means that you must clean up after yourself, which includes washing your glassware, emptying your own biohazard waste, and cleaning your workspace before leaving each day. If you are unable to adhere to lab safety protocols, then you will be asked to withdraw from this course to avoid a failing grade.

Lab Citizenship is an overall grade based on your etiquette in the lab. As a member of the lab, you are expected to adhere to our shared values outlined in detail here: <https://www.stubbendiecklab.com/values/>. You are also expected to help maintain cleanliness in the lab and contribute to laboratory chores.

Notebook and Record-Keeping is an overall grade based on your record keeping. You are required to maintain a lab notebook as part of this course. Your notebook and the data contained within are property of the laboratory and Oklahoma State University. As such, your notebook should **never** leave the lab.

Lab notebooks are the backbone of scientific research. Your notebook is a legal document that serves as a record of the experiments you perform in the lab, provides critical details required for you (and others) to reproduce your experiments, and describes the results that you obtain. Well-kept notebooks are the hallmark of good science and ensure that your experiments can be reproduced, protect you from accusations of fraud, and are admissible in court as evidence for inventorship or intellectual property. While your notebook does not need to be perfect and does not need to be formal, it must establish the procedures that you used to conduct an experiment, accurately document your observations, and contain (or point to) the data you've collected. I will perform weekly notebook checks to understand where you are in your research and to determine if you are fulfilling the notebook requirements outlined here: <https://www.stubbendiecklab.com/values/#record-keeping>. If you are not meeting these requirements, you will be asked to withdraw from this course to avoid receiving a failing mark. Also, I will not publish your findings until they are properly replicated.

There is almost nothing more tragic or heartbreaking than losing your hard-earned work to a failed hard drive or stolen laptop. It is also completely avoidable. Do not use instrument computers for long-term data backup. In addition to storing data locally on your own or laboratory computer, your data should be backed up in at least two additional locations, including your folder in the lab's shared OneDrive.

If you generate bacterial mutants or isolate strains as part of your work in the lab, then they must be properly deposited in the strain collection. This includes recording all metadata in our strain database. If this information is not recorded, then the strain can't be used and it will be discarded.

Research Progress is an overall grade based on how your studies in the lab are going. This grade will depend on a number of factors, such as your ability to work (relatively) independently by the end of the semester, your ability to start and finish experiments, and your ability to interpret the data you collect by the end of the semester. Your grade in this category is **not** dependent on whether or not your research project is successful. Remember: sometimes a project idea will not work no matter how much effort you put in.

The Final Report/Presentation is a mutually agreed upon assessment of your time in the lab. This can include a written report, a presentation at lab meeting, a poster presentation at a University-sponsored event, or something else altogether. A final report/presentation is required. While I am happy to be flexible with the nature of this assessment (especially when this course can be taken for variable credit hours), all students deserve full disclosure when it comes to determining what are fair requirements for a final report.

If you have a research mentor in the lab, then I will consult them in calculating your points for the above components. The following shows your formal grade distribution:

Attendance*	200 Points
Certification*	100 Points
Safety*	100 Points
Lab Citizenship*	100 Points
Notebook and Record-Keeping*	200 Points
Research Progress	200 Points
Final Report/Presentation	100 Points
Total:	1000 Points

\*If you receive 0 points in any of these categories, you will fail this course unless you withdraw.

Your final letter grade will be determined by the amount of points you earn as follows:

<b>A:</b>	≥900 Points (≥90%)
<b>B:</b>	800-899 Points (80-89.99%)
<b>C:</b>	700-799 Points (70-79.99%)
<b>D:</b>	600-699 Points (60-69.99%)
<b>F:</b>	<600 Points (<60%)

**Academic Integrity:** Oklahoma State University is committed to the maintenance of the highest standards of integrity and ethical conduct of its members. This level of ethical behavior and integrity will be maintained in this course. Participating in a behavior that violates academic integrity will result in your being sanctioned. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination or course, receiving a notation of a violation of academic integrity on your transcript, and being suspended or dismissed from the University.

Students have the right to appeal the charge. If you have any questions, contact me and/or the Office of Academic Affairs (101 Whitehurst, 405-744-5627, [provost@okstate.edu](mailto:provost@okstate.edu)). The complete Academic Integrity Policy and Procedures can be accessed here: <http://academicintegrity.okstate.edu/>.

**Use of Generative AI:** You may access and use generative AI tools, such as ChatGPT, Bing AI, or Bard, to assist your work in this course. Appropriate uses may include generating ideas for writing assignments and assessing your writing for grammatical errors, and troubleshooting your code. Such uses of these tools may assist your learning and will therefore be permitted. However, you are prohibited from using generative AI tools to completely produce, reproduce, and/or manufacture papers and/or other assignments without using any personal effort devoted to the learning process. Before using generative AI tools, you should check to ensure they do not conflict with copyright laws or other's proprietary information. Always verify the output of from any generative AI.

**Syllabus Contract**

I have read and agree to abide by the procedures outlined above. I understand that non-compliance of the procedures listed in this document may result in a failing grade for this course and dismissal from the lab.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

Dr. Reed Stubbendieck

DRAFT