MICR:4161 (Undergraduate Research in Microbiology and Immunology)

(Every faculty member supervising a student taking MICR:4161 and every student taking MICR:4161 should receive a copy of these guidelines)

Students enrolled in MICR:4161 receive training in research process skills and scientific communication by completing an independent, investigative research project mentored by a faculty member affiliated with the Department of Microbiology and Immunology or in an approved laboratory outside the Department of Microbiology and Immunology. Students conducting independent research are given the unique opportunity to connect what they have learned in their courses to cutting-edge research in Microbiology and Immunology.

Four (4) semester hours (s.h.) of MICR:4161 credit may be used to satisfy advanced Microbiology requirements for the B.S. degree. If students are in labs for more than one academic year, they are encouraged to take more than 4 s.h. if it fits into their schedule. Any extra hours will count as University of Iowa elective credits.

A student taking research for credit cannot be paid as student hourly during the time that they are doing research for credit. Allowable exceptions are fellowships such as OUR (formerly ICRU) Research Fellowships, the Stinski Fellowship, and the Iowa Sciences Academy Fellowship.

COURSE OUTLINE AND EXPECTATIONS:

Enrollment

For approved research conducted *within* the Department of Microbiology and Immunology

- Every student taking MICR:4161 must sign up for MICR:4161 with a primary or secondary Microbiology and Immunology faculty member.
- Students are expected to work a minimum of 3-5 hours per week for every semester hour of enrolled credit. Time commitments and schedules must be discussed with the research mentor. It is strongly recommended that a student signs up for 2 or 3 credit hours per semester. Students should expect to put in the necessary time to make progress on their projects. This will sometimes include time spent on evenings and weekends.
- The time commitment expectation doubles if a student enrolls in MICR:4161 during the 8-week summer session; students are expected to work a minimum of 6-10 hours per week for every s.h. of enrolled credit.

For approved research conducted *outside* of the Department of Microbiology and Immunology

- The research mentor must be a faculty member (tenured, tenure-track, or research track) at the University of Iowa.
- For approval, a project should be related to microbiology or immunology. If this is in question, the project will need to be evaluated by the departmental Director of

Undergraduate Studies (DUS) and approval may be granted on a case-by-case basis.

- The project must be hypothesis-driven and involve experiments or field research in which data are gathered and analyzed. Survey or interview-based research is not appropriate. Questions on whether the research project is appropriate can be addressed to the departmental DUS.
- The faculty research mentor along with the student must identify a faculty member in the Dept. of Microbiology and Immunology who agrees to act as a "mentor-of-record." For certain faculty outside of the department who have successfully trained Microbiology undergraduates previously and who are approved by the department, the requirement for a mentor-of-record may be waived. In this case the non-departmental faculty mentor will be responsible for all aspects of oversight and grading.
- The Microbiology and Immunology faculty mentor-of-record has certain, but limited, responsibilities for project oversight and consultation with the non-departmental faculty research mentor under whom the research is conducted.
    - The mentor-of-record meets with the student and research mentor in-person or by video conference to discuss the project before the student signs up for research credits.
    - The research mentor, mentor-of-record, and the student decide upon the number of credits to take.
    - While the mentor-of-record can provide guidance, the research mentor ultimately bears responsibility for project and student oversight.
    - The mentor-of-record, in consultation with the research mentor, agrees to provide midterm grades and final grades through MAUI.
    - This set of guidelines must be reviewed and agreed upon by the student, the research mentor, and the mentor-of-record.

Grading

- The faculty research mentor (either departmental or non-departmental) is responsible for informing the student of the basis on which the final grade will be given:
    - Laboratory effort/accomplishment
    - Evaluation of final paper or presentation (oral and/or poster) to determine student grade.
    - Students are strongly encouraged to present their research at the Spring Undergraduate Student Poster Session of the Department of Microbiology and Immunology and this may be used as part of the grade evaluation.
- If the work was conducted *outside* the Department of Microbiology and Immunology, the faculty research mentor should consult with the Microbiology faculty mentor-of-record for evaluation. Submission of the assigned grade is the responsibility of the faculty mentor-of-record in the Department of Microbiology and Immunology.

If there are any questions regarding this course or its requirements, please contact the

undergraduate academic advisor Bren Linley, 335-1531 or Al-Klingelhutz (al-klingelhutz@uiowa.edu), 335-7788

MICR:4161 Research Experience Expectations

Values	Students will	Faculty Mentor will
Responsibility	• behave properly in the lab and accommodate themselves to the routines of the lab, • inform the mentor promptly and early whenever a change of schedule is necessary, • be a self-starter, ready to offer suggestions and accept responsibilities, and • complete the tasks assigned to them.	• inform student of the lab's code of practice, • assess the suitability of the scope of the research project and establish a manageable work plan with the student at the onset, • designate staff or student from the lab to peer coach and guide the student in the day-to-day lab work, • provide student with resources • be patient.
Respect	• develop good working relationships with others in the lab, • follow instructions and advice of the mentor and supervisor.	• encourage student to treat all lab members with respect, • treat the rotating student with respect.
Perseverance	• learn to pursue his/her interest until completion of the research work, and • not give up easily when things go wrong.	• help guide the student along to enable them to complete a manageable amount of research within the timeframe given.
Adaptability	• accept an alternative project graciously.	• provide a worthwhile experience that gives the student some insight into the world of research.
Commitment	• be punctual, attend the sessions as agreed upon, and connect in advance whenever a change of schedule is necessary, • familiarize themselves with the background information of the project and develop an understanding of the work they are doing and how it contributes to the overall goal of the lab.	• explain the relevance of the research done by the student in relation to the research carried out by the PI's team of researchers.

Plagiarism in reports is not tolerated and will result in a zero for the report and/or an F for the whole course. The student is responsible for understanding what kinds of actions constitute plagiarism under University of Iowa policy. These are available in the College of Liberal Arts and Sciences student handbook: (*http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code*).

Laboratory Performance, Teamwork & Ethics, and Communication Skills Assessment Form

Rating level

3 – Consistently good
2 – Occasional lapses
1 – Needs improvement

Rating	Laboratory Performance
	Follows laboratory safety procedure and practices.
	Able to prioritize laboratory work and use time efficiently.
	Able to analyze own data with some assistance.
	Makes attempts to pose new questions.
	Self-directed, can accomplish tasks without supervision, and willing to ask for help when appropriate.
	Can solve problems and trouble shoot experiments.
Rating	**Teamwork & Ethics**
	Takes responsibility for maintaining a clean and orderly laboratory environment.
	Shows willingness to work with others and functions effectively as a team member.
	Maintains integrity in the recording and interpretation of data and in drawing conclusions based on solid evidence.
Rating	**Communication Skills**
	Can clearly communicate the broad and specific gap of knowledge that their research project seeks to address.
	Uses appropriate scientific terminology to accurately describe results (how the data were collected and analyzed; controls that were used, etc.)

	Clearly distinguishes between plagiarism and appropriate referencing of others' work.