

***BMS/MIC 498 Syllabus
Undergraduate Research in Biomedical Sciences
Fall/Spring/Summer***

COURSE INFORMATION

Tutorial Format

Credit Hours: Variable (1-6 credit hours)

Instructor(s): Arranged based on agreement between faculty member and student.

Course Director: Dr. Amy Jacobs (ajacobs2@buffalo.edu) will approve research form and submit final grades with input from the student and the principal investigator.

COURSE DESCRIPTION

The purpose of this course is to expose students to research being conducted in the Biomedical Sciences. The course will consist of a program of supervised research to be agreed upon by the student and a faculty sponsor in the participating department.

STUDENT LEARNING OUTCOMES

By the end of this research experience, students will be able to:

- Demonstrate understanding of the scientific process and core concepts in biomedicine.
- Formulate a clear, testable research question or hypothesis.
- Design and conduct experiments using appropriate biomedical research methods and techniques.
- Collect, manage, and analyze data accurately and responsibly.
- Interpret results in relation to existing scientific literature.
- Identify limitations of experimental design and suggest improvements.
- Apply principles of research ethics, including data integrity, authorship, and safety protocols.
- Communicate research findings effectively in both written and oral forms.
- Collaborate productively as part of a research team.
- Reflect on their growth as researchers and articulate how the experience informs future academic and career goals

RUBRIC

Outcome	Exemplary A-B	Proficient B-C	Developing C-D	Beginning D-F
Knowledge of Biomedical Concepts	Demonstrates deep understanding and applies concepts accurately in all contexts.	Shows solid understanding with only minor errors.	Demonstrates partial or superficial understanding; occasional errors.	Lacks basic understanding; frequent errors.
Research Design & Execution	Independently formulates hypothesis, designs	Designs appropriate experiments	Requires substantial guidance in	Cannot design or execute meaningful experiments.

	rigorous experiments, and executes with precision.	with guidance; executes competently.	design and execution.	
Data Management & Analysis	Collects, organizes, and analyzes data with accuracy; applies correct statistical/analytical methods.	Collects and analyzes data with minor inconsistencies.	Data collection incomplete or analysis flawed.	Data management disorganized; analysis absent or incorrect.
Critical Thinking	Thoroughly interprets results, identifies limitations, and proposes logical next steps.	Adequately interprets results and acknowledges some limitations.	Interpretation simplistic; limitations rarely recognized.	Unable to interpret results or recognize limitations.
Ethics/Professionalism	Consistently follows ethical principles, safety standards, and responsible conduct of research.	Usually follows ethical and safety standards with few lapses.	Occasionally neglects ethical or safety standards.	Disregards ethical principles or safety.
Communication	Communicates research clearly and persuasively in oral and written forms tailored to audience.	Communicates effectively with minor issues in clarity or format.	Communication lacks clarity or depth.	Unable to communicate findings effectively.
Collaboration	Actively contributes to team, shows leadership, and fosters group success.	Works well with team; contributes reliably.	Participation inconsistent; contributes minimally.	Rarely participates; hinders team progress.
Reflection & Career Development	Insightfully reflects on growth, connects research to future goals.	Reflects thoughtfully with some connection to goals.	Reflection limited; vague career connection.	Provides little or no reflection on experience.

COURSE REQUIREMENTS

Specific course requirements will be developed by the student and faculty member and will be agreed to in writing. Regardless of lab specific requirements, the expectation will be that the time spent meeting requirements will follow standard time guidelines for academic credit (i.e., approximately 3 hours per week for the 15-week semester for each credit hour registered).

GRADING POLICY

Students will be evaluated at the end of the semester using the standard evaluation form (see attached) unless otherwise instructed by faculty. Additional evaluation criteria will be articulated and agreed to in writing by the student and faculty member. MIC 498 uses an A-F grading system.

FINAL GRADES:

Grade	Quality Points	Percentage
A	4.0	93.0% -100.00%
A-	3.67	90.0% - 92.9%
B+	3.33	87.0% - 89.9%
B	3.00	83.0% - 86.9%
B-	2.67	80.0% - 82.9%
C+	2.33	77.0% - 79.9%
C	2.00	73.0% - 76.9%
C-	1.67	70.0% - 72.9%
D+	1.33	67.0% - 69.9%
D	1.00	60.0% - 66.9%
F	0	59.9 or below

Incompletes (I/IU)*: A grade of incomplete (“I”) indicates that additional course work is required to fulfill the requirements of a given course. Students may only be given an “I” grade if they have a passing average in coursework that has been completed and have well-defined parameters to complete the course requirements that could result in a grade better than the default grade. An “I” grade may not be assigned to a student who did not attend the course.

Incompletes (I/IU)**: Prior to the end of the semester, students must initiate the request for an “I” grade and receive the instructor’s approval. Assignment of an “I” grade is at the discretion of the instructor.

For all graduate-level courses, an interim grade of Incomplete (I) may be assigned if the student has not completed all requirements for the course. An interim grade of 'I' shall not be assigned to a student who did not attend the course. For all graduate courses the default grade accompanying an interim grade of 'I' shall be 'U' and will be displayed on the UB record as 'IU.' The default Unsatisfactory (U) grade shall become the permanent course grade of record if the 'IU' is not changed through formal notice by the instructor upon the student's completion of the course.

Assignment of an interim 'IU' is at the discretion of the instructor. A grade of 'IU' can be assigned only if successful completion of unfulfilled course requirements can result in a final grade better than the default 'U' grade. The student should have a passing average in the requirements already completed. The instructor shall provide the student specification, in writing, of the requirements to be fulfilled.

ACADEMIC INTEGRITY

Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas.

- Reference to the university Undergraduate* (<http://undergrad-catalog.buffalo.edu/policies/course/integrity.shtml>) or Graduate** (<http://grad.buffalo.edu/Academics/Policies-Procedures/Academic-Integrity.html>)

ACCESSIBILITY RESOURCES

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 25 Capen Hall, (716) 645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations.

<http://www.student-affairs.buffalo.edu/ods/>

ATTENDANCE POLICY

Attendance is expected as agreed upon by the student and faculty member in the submitted research form. Acceptable absences may include attendance issues related to:

- Religious observances
- University sanctioned events
- Athletic commitments
- Family/Work obligations/emergencies
- Course Cancellation/ Emergency Planning
- Reference the university website for cancellations/delays due to weather or other unforeseen events (<http://emergency.buffalo.edu/campus-weather-alerts.html>)