

PLB 498 – Undergraduate Research Proposal Guidelines

PLB 498 Proposal Guidelines

These guidelines are intended to provide you with a framework for developing your research proposal for PLB 498. We encourage you to discuss the proposal and its elements with your research mentor before you even begin writing it. They are likely to have helpful suggestions and resources that will make your writing more efficient. In addition, your research mentor must approve the final contents of your proposal including plans for evaluation of your participation in PLB 498 before you submit it to the Undergrad Director, so it is in your interest to invite their input early on.

Who can serve as a Research Mentor? Graduate students, techs, and postdocs that work in the lab can all serve as mentors to guide your work and provide helpful feedback on your proposal and other research products. However, only an MSU faculty member (Primary Investigator, or PI) can submit a grade on your behalf.

Proposal components:

Title: Concise; conveys the main objective or finding of the study. Should include:

- Study system
- Variables
- Result (expected or observed)

Introduction: Should communicate the relevant background and context for the study, as well as rationale.

The introduction should explain why the experiment will be performed and what it is designed to test with respect to what is already known in the field. How will this study contribute toward advancing knowledge in the field? A well-structured introduction will present (not necessarily in this order):

- Relevant and correctly cited background information, including information about the study system and/or context in which the research will be conducted
- A clear statement of the research question and hypothesis
- A rationale for why the question is relevant – i.e., the knowledge gap that this research will address

Methods: Describe how the hypothesis will be tested. Ideally, a methods section will clearly, concisely, clearly, and chronologically describe the procedures used such that a knowledgeable reader could replicate the experiment and understand expected results. Most methods sections include descriptions of:

- Protocols or procedures that will be used (cited, if relevant)
- Controls and treatments, and how they will inform the experiment and findings
- Mathematical manipulations or statistical analyses that will be used to analyze results
- An anticipated timeline for your research (relative window of time for activities)

Expected Outcomes and Implications: What do you expect to find and *learn* from your study? If there are alternative or competing hypotheses, describe how different results will inform our understanding of the system. Here, it is important to loop back to your original research question and rationale for your study. Based on what is already known or has been done in the field, explain how your research will advance understanding. If possible, use figures, graphs or other visuals to communicate your expected outcomes.

Literature Cited: Follow APA style (Author, Year) for citing research in-text and include a full bibliography at the end.

Grammar, Language and Organization matter! Have your research mentors review and provide feedback on drafts of your proposal to ensure it is clear and easy to follow. Use future tense and ensure there are no grammatical or spelling errors.