

## **BIO 649 Independent Study for Thesis (Summer, Fall or Spring) - 2 Credits**

The purpose of BIO 649 is to allow MCB students to complete the first steps toward undertaking a Masters Thesis which includes reading scientific articles on the thesis advisor's research topic and devising a research question and completing preliminary research. During BIO 649, students will conduct literature review and research for a minimum of 6 hours a week (3hr/credit). Towards the end of Independent Study (BIO 649) students will submit a written thesis proposal to their committee\* and defend their proposal with a committee meeting (presentation) about 1-2 weeks later. Ideally, the presentation should be completed near the end of the semester (for summer study this would typically be mid-late August) and it's a pre-requisite for progress to Thesis I (BIO 650).

### First Steps:

- Be declared eligible for thesis (minimum graduate GPA = 3.5)
- Identify and secure a thesis advisor who will support your research
- Meet with MCB Program Director.
- Complete BIO 649 Independent Study Form and submit to MCB Program Director for approval

### BIO 649 Independent Study Form:

- Obtained from MCB Program Director or downloadable from MCB website.
  - Form **must** include:
    - Short description of the research proposal (1-3 paragraphs). This proposal must include an overall goal/thesis topic (by agreement with mentor) as well as overview of main experimental approaches. A sample BIO 649 proposal can be obtained from the MCB Program Director.
    - "Criteria and Method of Evaluation" to be completed by mentor.
- BIO 649 (2 credits):
- 20% Written Proposal (required)
  - 20% Proposal Oral Defense (required)
  - 20% Laboratory notebook
  - 20% Attendance at weekly lab meetings
  - 20% Hand-on laboratory research (including attendance)
- The completed registration form must be submitted to the MCB Program Director for approval by deadline (typically April 1).

### Goals as defined in the MCB Thesis Handbook:

1. To work with your thesis advisor to research and write a thesis proposal that includes:
  - Extensive literature search of advisor's research topic
  - Aims of the study/ Thesis question - at least 1 aim must consist of analysis and/or manipulation of data at the biomolecular, cellular or sub-cellular level.
  - Experimental approach proposed to answer research question(s)
  - Expected outcomes

- Preliminary Results

2. Conduct preliminary research experiments that demonstrate that project aims are feasible and that student has developed or is developing the technical skills necessary for a successful thesis. Validation of a molecular component of your aims (see Aims above) must be completed during BIO 649 and reported as part of thesis proposal.

3. \*Identify and secure at least three Thesis Advisory Committee members (thesis advisor and 2 other members; one of whom must be a tenured QU Biology faculty member). The Thesis Advisory Committee should be chosen in consultation with your advisor by the midway point of BIO 649.

4. Schedule a meeting with the Thesis Advisory Committee near end of the semester for an oral presentation of the thesis proposal.

5. Obtain approval from your thesis advisor for distribution of your thesis proposal to your Thesis Advisory Committee.

6. Distribute copies of your thesis proposal to your Thesis Advisory Committee members at least one week before the Thesis Advisory Committee meeting.

7. Successfully defend your proposal with the Thesis Advisory Committee. The presentation should last approximately twenty to twenty-five minutes and cover all phases of the proposal.

8. Obtain Thesis Advisory Committee approval to continue on to BIO 650, Thesis I. If approval is not obtained, you may not continue with a thesis masters, and must switch to the non-thesis track. Your grade for BIO 649 will be determined by the grading rubric established by the Thesis Advisor as well as your oral and written performance in consultation with the Thesis Advisory Committee. A final grade will be submitted to the registrar by your Thesis Advisor or the MCB Program Director (if the Thesis Advisor is not affiliated with QU).

Written Proposal Guidelines:

The written proposal must be clear and conform to the following requirements:

A typeface of Arial or Helvetica (font size 10 points or larger). A smaller font size may be used for figure, tables, etc. All margins should be one inch.

The length should be between ~10-20 pages and should include the following sections:

- Title of research project
- Introduction/Background: This is an introduction to your project and includes the background information you gathered during BIO 649. It can include diagrams to illustrate background concepts. This section should discuss the specific ideas of your project and your general hypotheses and should highlight the relevance of your studies.

- Aims/Thesis question: Your aims should be broken down by the area of research you are conducting. at least 1 aim must consist of analysis and/or manipulation of data at the biomolecular, cellular or sub-cellular level.
- Expected Outcomes: This section includes the general way you will test each aim and the expected outcomes.
- Experimental Approach/Methods: A description of the methods and assays you will use to study each aim. This can include techniques for data collection and data analysis.
- Predicted Timeline: The general timeline of your project should be noted. It should include a list of what you are going to accomplish and how long you anticipate it will take to complete each aim.
- Preliminary Results/Progress: this section should include preliminary results you may have obtained.
- References

Oral Proposal Defense:

- You will give an oral Powerpoint presentation to your Thesis Advisory Committee explaining the literature-based background to your research topic, the main thesis question, experimental design proposed to answer the question, a reasonable timeline to complete the thesis, and any preliminary data. The oral proposal should be between 20-35 minutes in length. Your final grade will be determined by the Thesis Advisory Committee in consultation with the Thesis Advisor.

The following link provides a helpful video about slide design: <https://www.ibiology.org/nrmn-resources/oral-presentations-using-slides-effectively/>

**Academic Integrity Polity:** The issue of academic integrity is taken very seriously at Quinnipiac. You are responsible for knowing and understanding the Quinnipiac University Academic Integrity Policy. Please review the policy: <http://www.quinnipiac.edu/about/academic-integrity/> and Academic Catalog. In attending Quinnipiac, you have agreed to adhere to this polity. All work submitted for a grade in this course must be created specifically by for this class. Any work found to contain plagiarism from ANY source (hardcopy or electronic) will be reported to the Committee on Academic Integrity.

Any work submitted for a grade will receive a letter grade of “F” if it contains plagiarized work. If the work is from a group, then all members of the group will receive an “F”.

Scientific papers often rely on paraphrasing the results of primary research papers. It is tricky to paraphrase detailed work, but it is very important to do so well since incorrect paraphrasing is a form of plagiarism. If you are having trouble with paraphrasing, please see me or contact the Learning Center.