

# APBI 497 – DIRECTED STUDIES IN APPLIED BIOLOGY

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## ACKNOWLEDGEMENT

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UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xwməθkwəyəm (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

## COURSE INFORMATION

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Course Title	Course Code Number	Credit Value
Applied Biology Directed Studies in Applied Biology	APBI 497 (A through E)	2-6 credits; typically completed as 3 (Section B) or 6 (section E)

**\*Registration forms and proposals are due one week before the first day of classes.**

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## PREREQUISITES

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No specific prerequisites. APBI 398 Research Methods or similar course is recommended.

## ADMISSION

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Admission to APBI 497 is coordinated through the **APBI undergraduate program advisor**, and must be recommended by the **APBI faculty member who will be supervising the work**. If students interested in APBI 497 are from outside the program of Applied Biology in the Faculty of Land and Food Systems, they should contact the undergraduate program advisor for their major to confirm how this course will be applied to their degree requirements. For students in the Applied Biology Program, APBI 497 is counted as a restricted elective (see [https://wiki.ubc.ca/LFS:Restricted\\_Electives](https://wiki.ubc.ca/LFS:Restricted_Electives))

The APBI Undergraduate Program Advisor is Dan Naidu ([Dan.Naidu@ubc.ca](mailto:Dan.Naidu@ubc.ca)). Opportunities for conducting projects are limited and registration in APBI 497 is not guaranteed. Please see the section on "Registration" for additional details.

## COURSE STRUCTURE

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Students typically register in 3-credits of APBI 497 which are undertaken within a single semester. Less-typically, students register in 6-credits of APBI 497 which are undertaken either in a single semester or over two semesters. Where students would like to complete a 6-credit directed study, they must provide a rationale for why a directed study is being requested instead of the 6-credit undergraduate thesis (APBI 499).

Students are expected to complete the majority of the work within the semester(s) in which they are registered; however, some research projects may not fit the academic calendar. Students should consult the Program Advisor regarding questions related to overall scheduling.

Work completed in a Directed Studies must be unique and cannot overlap with another Directed Studies, Practicum (i.e. APBI 496, LFS 496), Undergraduate Essay (i.e. APBI 498) or Undergraduate Thesis (i.e. APBI 499). Questions regarding this should be directed to the Program Advisor.

Students are limited to the number of credits from self-directed studies that can be counted towards their degree (i.e. APBI 496, 497, 498, 499; LFS 496, others). Questions regarding this should be directed to the Program Advisor.

This course provides a means for individual students to undertake customized projects that will help to develop and strengthen research skills and to accommodate special research interests that cannot be met through other APBI courses.

There is no set / synchronous meeting time for this course. Instead, the work plan is arranged and agreed to by the student and the supervising faculty member. It must be set out in writing with a copy to the student, faculty member, field supervisor (if relevant) and undergraduate advisor. Typically, the work plan will consist of a definable project requiring literature and/or laboratory or field research and a written report.

Students will be expected to spend approximately 50 hours of work per credit (e.g. a 3-credit directed studies course would require approximately 150 hours). A regular schedule of consultations should be pre-arranged between the supervisor and the student to monitor progress. The meeting time should form a regular entry on the timetables of both the student and the supervisor.

If the project is to be conducted totally, or in part, at a location other than UBC, the supervising faculty member will make appropriate arrangements for regular monitoring of progress and time; this might entail appointment of an on-site research supervisor.

If the project to be conducted is associated with a summer or part-time, paid or volunteer position held by the student, care must be taken to ensure that any hours of work on the directed studies project are over and above those required by the related position. The supervisor must be satisfied that this requirement has been met.

## LEARNING OUTCOMES

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The objective of this course is to provide students with an introduction to independent study. Students will develop skills in working with an academic supervisor, developing a research plan, conducting research, analyzing data, and describing on their research both orally and in a written report.

## LEARNING ACTIVITIES

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### Responsibilities of the Academic Supervisor

The Academic Supervisor must be a faculty member from the Faculty of Land and Food Systems. This person oversees the student's progress and is responsible for submitting a final grade to LFS Student Services. Specific responsibilities include:

- Selection of appropriate project in conjunction with the student.
- Provision of suitable laboratory supplies and equipment to perform the work.
- Remain in compliance with all safety and ethics requirements.
- Provide guidance on experimental design, data analysis, and presentation of results.
- Schedule regular meetings with the student.
- Give feedback on the report draft in a timely manner.
- Arrange for a second evaluator and evaluating the student lab work and report write-up.
- Submit a grade to LFS student Services upon completion of the course.

The involvement of the supervisor should normally be limited to the first draft of the report. The role of the supervisor in the written report should be restricted to:

- 1) providing general recommendations regarding structure, development, and progression of ideas; and
- 2) providing advice on the general format of the report, according to the guidelines, and the use of correct grammar, spelling, and sentence structure.

### **Responsibilities of the Research Supervisor**

In some cases, there may also be a Research Supervisor. This is a person who may oversee the student's day to day work, for example a graduate student or an adjunct faculty member at a partner organization.

- Work under the direction of the Academic supervisor in relation to the Directed Studies Student.
- Oversee day-to-day activities related to research.
- Remain in compliance with all safety and ethics requirements.

### **Responsibilities of the student**

- Make arrangements well in advance to work under the guidance of a faculty member as a project supervisor.
- Strict adherence to deadlines and guidelines for the course, as stated in this document and arranged with the supervisor.
- Completion of all required safety and ethics training in advance of commencing research activities.
- Remain in compliance with all safety and ethics requirements.
- Submit copies of the project proposal to the project supervisor by the agreed due date. The project proposal (2- 4 pages) will consist of the following information:
  - The aim or hypothesis of the project.
  - The significance of the project (why is it interesting or important), supported by relevant background information and literature.
  - The approach/procedures to be used.
  - The potential problems or difficulties that might be encountered in the project.
  - The time-line for the work (the date when specific steps or milestones will be completed, including the date of submission of the written report).
- Allocate appropriate time to this course over the term(s)
- Submit a brief (one or two pages) progress report to the project supervisor by the due date. This report should state:
  - Major accomplishments in the work to that time.
  - Major problems in the project.
  - Significant changes in the aim or approach for the project.
  - Remaining work to be completed before writing up the final project report.
- Submit the final report for evaluation at the end of the term. The supervisor may request that these be either printed or electronic.

### **LEARNING SCHEDULE**

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The Learning Schedule will be established between the student and the research supervisor at the time of registering for the course. The following provide suggested deadlines for major milestones typical for Directed Studies.

For students enrolled in a 3-credit directed study or for 6-credits/1-term directed study, the following deadlines are suggested:

Milestones	Sept - Dec Schedule	Jan– April Schedule
Submission of project title and name of supervisor to undergraduate advisor	September 7	January 7
Project proposal	September 15	January 15
Project progress report	October 30	February 28
Research completed	November 15	March 15
Submission of report draft to supervisor	November 28	March 30
Submission of final report copy to supervisor	December 5	April 7
Completion of the oral report	December 15	April 17

The following deadlines are suggested for students enrolled in a 6-credit / 2-term Directed Study. The student and their supervisor must discuss and come to an agreement on deadlines at the start of the project.

Milestones	May – Aug Schedule	Sept – April Schedule
Submission of project title and name of supervisor to undergraduate advisor	May 1	September 15
Project proposal	May 15	October 1
Project progress report	June 30	January 15
Research completed	August 1	February 15
Submission of report draft to supervisor	August 14	March 15
Submission of final report copy to supervisor	August 21	April 7
Completion of the oral report	August 28	April 17

Target deadlines, established within two weeks of the start of the course, should be set for the completion of various phases of the project to ensure timely completion.

### ASSESSMENTS OF LEARNING

For purposes of determining a grade for a directed studies course, evaluation will be conducted by the supervisor and at least one other faculty member selected by the supervisor or the undergraduate advisor. Where feasible and necessary, a common standing review committee will be struck. Evaluation will be based on the terms defined at the beginning of the Directed Studies; for example, it could be based upon a written report and the organization and conduct of the project work if this was agreed upon at the beginning of the course.

One suggestion for an evaluation scheme for a project involving both literature and laboratory or field research and a final report is given below. This scheme is an example only; there is flexibility under the Directed Studies to customize the course deliverables. The proposed scheme, however, must be included in the proposal provided by the student and Academic Supervisor at the time of registration to ensure that the assessments have been agreed upon in advance.

For example, the student and Academic Supervisor may agree in advance that the final report will take the format of a research poster and the final oral report will take the form of participation in a research conference

such as the Multidisciplinary Undergraduate Research Conference at UBC. This must be clearly laid out in the initial proposal to ensure that all involved in the Directed Studies are in agreement. Below is an example of an evaluation scheme that could be used for a directed study and submitted with the registration package.

### Example of Possible Evaluation Scheme

#### *Lab Work / Field Work (20-30% weighting of final mark)*

- Initiative; Technique; Comprehension; Organization, work habits, attention to safety/proper protocols; Dedication and Perseverance.

#### *Final Written Report (50% weighting of final mark)*

- Abstract
  - A concise summary of the report; No abbreviations should be used.
- Introduction, Statement of Objectives
  - Introduction of the research topic;
  - Clear outline of the hypothesis, rationale, objective and specific aims of the project.
- Literature Review
  - Showing depth and scope of the pertinent literature
- Materials and Methods
  - Concise and explicit description of the experimental methods used
  - Detailed description of newly developed methods
  - Citation of appropriate references for methods not performed by the student themselves
  - Source of materials and chemicals used
  - Methods used for data analysis, if appropriate
- Results
  - Presentation of figures, tables, appendices where applicable, in a manner that is commonly used in research publications for the area.
  - Inclusion of statistical significance of data.
  - Presentation of data solely generated by the student during the project.
- Discussion
  - Demonstrating critical analysis of results and comprehension of subject area
- Conclusions
- References
  - Citation of all literature referred to in the report
  - Consistent and appropriate format used

#### *Final Oral Report (20-30% weighting of final mark)*

- Content
  - Material is relevant and informative
  - The analysis is thorough
  - The content is well organized
- Delivery
  - Speaker is enthusiastic and engaging
  - The selected presentation format (i.e. PowerPoint or another tool) is clear and well assembled
  - Length is within the limits provided
- Questions

- Able to answer reasonable questions correctly and clearly

The following rubric can be used as a guide for expectations for the written report.

	<b>Research: thoroughness of research, adequacy of sources</b>	<b>Analysis: comprehension, originality, critical thinking</b>	<b>Presentation: structure, writing style, organization, clarity and carefully prepared references</b>
10	exceeds quality expected for undergrad report	very original ideas or interpretation, critical analysis that is well defended and plausible, combined with flawless comprehension	impeccable essay
9	very thorough research of relevant literature including primary scientific/scholarly literature where available.	high level of originality and critical thinking, combined with flawless comprehension	excellent essay in terms of structure, writing style and reference list
8	thorough research of appropriate sources	solid comprehension without much original analysis or interpretation	very good quality, perhaps with some flaws of grammar, spelling, paragraph structure, or inconsistency in referencing that do not affect clarity
7	adequate research of appropriate sources	reasonable comprehension, tendency to report rather than analyze different views	reasonable quality of presentation with some flaws of grammar, spelling, paragraph structure, or inconsistency in referencing, that have some effect on clarity
5-6	Just acceptable level of research of appropriate sources; reliance on secondary sources and websites rather than primary literature	Just acceptable level of comprehension	Just acceptable presentation which needs substantial improvement in areas such as structure, writing, grammar, such that clarity is affected significantly

## UNIVERSITY POLICIES

Details of the policies and how to access support are available on [the UBC Senate website](#).

## REGISTRATION

Students must complete a registration form which can be obtained from the course wiki site:

<https://wiki.ubc.ca/Course:APBI497>. In preparing the registration form, students are expected to complete the following in advance:

- Review the content of the Course Syllabus with the Academic Supervisor and the Research Supervisor (where applicable). Available at: <https://courses.landfood.ubc.ca/lfscourses/>

- Develop a project proposal summary which includes: 1) Research Goals; 2) Learning objectives, 3) Work Involved, 4) Outcomes / Output, 5) Assessment criteria and attach to the registration package.
- The student and Academic Supervisor have reviewed the necessary ethics requirements and agree to complete ethics trainings (as required)
- Review safety protocols (As required) and agree to abide by them. These safety protocols must be included in the registration package.
- Obtain signatures from the all parties indicated on the registration form except APBI Director. Program Advisor will facilitate APBI Director signature.