

BIOL F400
Biological Sciences Capstone Project
Spring 2019, 0 credits, CRN 33285
Prerequisites: Junior or Senior Standing

Course Coordinator

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Catalog Course Description

Enrollment in BIOL F400 signals that a student has initiated a capstone research project. The capstone project may be completed within a designated course or by working individually with a faculty mentor; see the biological sciences program description for more information.

Prerequisites

Junior or senior standing
Note that students should have a plan in place to initiate a research project before registering for this course.

This is Not a Normal Course!

The capstone experience for students in the Biological Sciences major is to complete a mentored research project. The project is carried out in a designated course or by working individually with a faculty mentor. The BIOL F400 “course” does not add to the project work involved; rather it is an administrative tool to keep track of students working on their capstone research in many different ways. BIOL F400 confers no credit and has no regular course meetings. However, you will receive occasional communications from the instructor and you are expected to keep the instructor informed about your progress.

The BIOL 400 instructor must know how you plan to complete your research project. If you are enrolled in a designated capstone class, the assumption will be that you are doing your research in that class. But if you plan to work individually with a faculty mentor, it is very important to contact the instructor and report who you are working with, what you are studying (briefly), and when you expect to finish. This needs to occur before the drop date on 25 Jan 2019.

Once you have completed the research project requirements and the faculty mentor confirms this is the case, the BIOL 400 instructor will report a passing grade on BIOL F400 to the registrar.

Goals and Learning Objectives

The broad goal of the capstone project is to integrate knowledge and skills learned in previous courses, including scientific knowledge, quantitative literacy, and communication skills, and to apply these products of the university education to a creative activity. For a biologist, a fundamental expression of applied knowledge, creativity, and critical reasoning is to engage in scientific inquiry.

The learning objectives of the capstone project are as follows:

- Learn through experience to pose and test biological hypotheses.
- Employ critical thinking by evaluating the scientific literature in the subject area.
- Reinforce and enhance quantitative knowledge by analyzing and interpreting data.
- Reinforce and enhance writing and oral presentation skills by communicating science.

Requirements of a Capstone Project

The capstone project in Biological Sciences consists of a mentored research project on a biological topic that is completed in the junior or senior year. The requirements are:

- The capstone project must be chosen by the student in consultation with a faculty mentor.
- The faculty mentor must at least informally approve the project before work begins.
- The project must include the evaluation of data. In most cases the student will collect an original data set, but working with an existing data set is also acceptable.
- The rationale, approach, and conclusions must be communicated in three ways.
 - A formal written report in the style of a scientific paper.
 - An oral presentation of the study goals and outcomes.
 - A short, non-technical summary of the project goals and outcomes, written for the public.

All capstone projects are assessed using a common set of expectations (see Final Evaluation of Capstone Project).

Students pursuing a BA in Biological Sciences are encouraged to incorporate aspects of social science or humanities into their capstone project.

For forms and more information about the capstone project in biology, see https://www.bw.uaf.edu/undergraduates/capstone_biology.php.

How to Find a Capstone Research Project

The capstone project requirement may be met in one of two ways.

1. Take a designated capstone course

A student may perform a project within a designated capstone course in Biological Sciences or Wildlife Biology and Conservation. Capstone courses are offered across a range of sub-disciplines within biology. A list of capstone courses in Biological Sciences may be found in the UAF catalog. All capstone courses include the expectation that the student will complete a biological research project. Typically, the capstone course instructor will introduce one or several model study systems and methodologies that will form the basis for the student's project. The course instructor will assist the student to design a study and analyze the results. The capstone requirement within a course will be fulfilled only when the capstone project itself is evaluated as adequate or better for all criteria identified on the Final Evaluation of Capstone Projects rubric. It is expected that the capstone project will constitute only a portion of the course grade. **Thus, it is possible for a student to pass a capstone course without receiving credit for the capstone project, and to receive credit for the capstone project without passing the course.** When the student has successfully completed the project, instructors will provide the Biology and Wildlife Department with a signed evaluation form and copies of the written assignments (the formal paper and the non-technical summary) to be archived by the department.

2. Work individually with a faculty mentor

A student may satisfy the capstone requirement by conducting a research project individually with a faculty mentor, typically a member of the UAF Biology & Wildlife faculty. A student may receive course credit for the research project by enrolling in independent study (e.g. BIOL F397 or F497),

and these credits may be applied to the student's degree requirements; however, course credits are not necessary for completion of the capstone project. **If the research mentor is not a member of the Biology and Wildlife faculty, then an additional faculty evaluation completed by a faculty member in the Biology and Wildlife Department will be necessary.** Students are encouraged to arrange a biology department evaluator well before the project is due. When the student has successfully completed the project, the student or research mentor should provide to the Biology and Wildlife Department a copy of the final paper and a copy of the Final Evaluation of the Capstone Project form, signed by the research mentor(s).

What If I Do Not Complete the Project Within a Semester?

A capstone research project might extend across several semesters, or an initial project may be abandoned in favor of a new one. In these cases, there is no need to register for BIOL F400 repeatedly. If the capstone project is not completed, or not completed satisfactorily, within a semester, the BIOL F400 grade will be deferred (DF) grade until a later semester. The DF will be changed to P when the student passes the capstone project. A DF grade will convert to a W after two years. The BIOL F400 instructor can prevent this conversion if the student demonstrates she or he is actively working to complete a project.

The Capstone Research Assignments in More Detail

Written report

All capstone projects must include a written assignment. This is typically a final report expressing the study goals, methods, findings, and conclusions written as a scientific paper, but may in some cases be a research proposal. It is recommended that written assignments are at least 8 double-spaced pages (excluding figures and references) and cite at least 10 relevant references.

Oral presentation

The findings of all capstone projects must also be communicated orally. Oral presentations may be delivered in class, at a scientific conference, at UAF Research Day, or in another instructor-approved setting. Digitally-illustrated oral presentations and poster presentations are the most common forms of oral presentation.

Non-Technical Summary

Communicating scientific results to the public is an important aspect of research. In addition to the formal written report, capstone research findings must be communicated in the form of a short, non-technical summary. The summary should consist of one or two paragraphs encapsulating the goal, approach, and findings of the study in language that could be understood by a non-scientist.

Assessment of the Capstone Project

The expectations and assessment of the capstone project are the same regardless of whether the capstone is completed within a designated course or by working individually with a faculty mentor. All capstone projects are assessed using a standard evaluation rubric, which is reproduced at the end of this syllabus. **A student must score “adequate” or above on all aspects of the evaluation in order to earn a passing grade on the capstone project.**

There are four possible grades for the BIOL F400 course, explained in the table below.

Grade	Interpretation
P	Pass - Indicates that the student earned a score of “adequate” or above on all points detailed on the capstone project evaluation rubric
DF	Deferred – Indicates that the student did not complete or pass a capstone project in the current semester. For example, the DF grade would be given if the project spanned more than one semester, or if the student did not receive “adequate” or above scores on the capstone evaluation form. When the student does pass a capstone project, the DF grade will be changed to a P.
W	Withdrew - A DF grade cannot remain on the transcript indefinitely. If after 2 year the BIOL F400 instructor does not extend the DF grade, it will convert to a W on the transcript.
F	Fail – Ordinarily, a student would not fail a capstone project, but rather would continue to revise the project until it received a passing grade. However, a student might receive an F as the consequence of a serious violation of the code of conduct.

Readings

There are no required reading for the capstone project but I highly recommend the following useful sources of information to students working with data and writing science.

- Quinn, G.P., and Keough, M.J. 2002. Experimental Design and Data Analysis for Biologists. Cambridge University Press, Cambridge.
- Schimel, J. 2012. Writing Science. Oxford University Press, Oxford.
- van Emden, H. 2010. Statistics for terrified biologists. Blackwell, Malden, MA.

Course Policies

All students are expected to be familiar with the UAF Student Code of Conduct (available online and in the UAF Catalog) and to follow it at all times. Academic dishonesty will not be tolerated. Acts of academic dishonesty will result in at least a failing grade for the current capstone project but may also result in more severe consequences, including expulsion from the University. Violations of the Code of Conduct will be reported to the UAF Dean of Students. Acts of academic dishonesty include, but are not limited to, the following.

- Plagiarism (see below)
- Cheating
- Fabricating data
- Obtaining an extension on an assignment or permission to miss a class through false pretenses
- Turning in an assignment that was prepared for a different class, unless you have received permission to do so
- Falsifying grade records

Plagiarism is the use of someone else’s ideas, text, or graphics without acknowledging the source. Plagiarism is a serious form of academic dishonesty. Examples include the following.

- Copying text verbatim from a print source, including websites, books, reports, or articles, whether published or unpublished, without quotation marks and attribution

- Changing a few words within a copied block of text to obscure its resemblance to the original
- Presenting a graph or table created by someone else in a written document without attribution
- Presenting someone else's data without attribution
- Presenting someone else's ideas as your own without attribution

Student Protections and Services Statement

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/.

Support Services

Computer software - The UAF Office of Information Technology provides access to computer programs that may be useful for analyzing and graphing data (JMP for statistics, Microsoft Excel for simple statistics and graphing).

Disabilities - The Office of Disability Services implements the Americans with Disabilities Act (ADA) and ensures that UAF students have equal access to the campus and course materials. The instructor will work with the Office of Disability Services (208 Whitaker, 474-5655) to provide reasonable accommodation to students with disabilities.

Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette st, 907-455-2860).

Final Evaluation of Biological Sciences Capstone Project

I. Written report

Date:	Student's Name:	UAF ID#:
Project Title:		
Research Project Supervisor:	Reviewer:	

	Yes (excellent)	Somewhat (adequate)	No (inadequate)
Is the capstone project the product of data collection and/or analysis by the student?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the capstone paper make a compelling argument for the significance of the student's research within the context of the current literature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the capstone paper clearly articulate the student's research goals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the methods appropriate given the student's research agenda?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the data analysis appropriate and accurate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the author interpret the results skillfully and accurately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the tables and figures clear, effective and informative?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a compelling discussion of the implications of findings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the literature review appropriate and complete?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the citations presented consistently and professionally throughout the text and in the list of works cited?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the writing appropriate for the target audience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the paper clearly communicated and free of language errors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Reviewer signature:

II. Oral Presentation

Date of presentation:

Circumstances of presentation (e.g. class presentation, Research Day poster presentation, conference oral presentation):

Assessment of presentation quality:

Excellent <input type="checkbox"/>	Adequate <input type="checkbox"/>	Inadequate <input type="checkbox"/>
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Comments on oral presentation:

III. Non-technical summary

Date:

Assessment of non-technical summary quality:

Excellent <input type="checkbox"/>	Adequate <input type="checkbox"/>	Inadequate <input type="checkbox"/>
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Comments on non-technical summary:

Reviewer signature: