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Spring 2020

## College of Natural Sciences, Forestry, and Agriculture\_AVIS 401: Senior Paper in Animal Science I

Suzanne Ishaq

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## AVS 401: Senior Paper in Animal Science I

**Dr. Sue Ishaq;** [sue.ishaq@maine.edu](mailto:sue.ishaq@maine.edu), 207-581-2770, 130A Hitchner Hall, office hrs by request

**Course time: Fall 2020 Tuesdays/Thursday, 3 – 4:15 pm**

**Course location TBD: Rogers 206 or virtual/online as needed**

**Description:** Students will draw together the knowledge and experiences they have gathered in their undergraduate program to create a Capstone experience. This takes the form of a project which reflects the culmination of their degree and the work typical of their academic field of study. Students will identify a faculty mentor to supervise their project, which investigates a problem in animal or veterinary science, aquaculture, or a related field. The investigation may include scientific research in a laboratory, farm, or field site; literature review; meta-analysis; survey; design problem solving; or other hypothesis-driven testing. For this course, students are required to submit a written experimental proposal describing their project and the process of testing and assessment, and present an oral report to faculty and students. AVS 401 and 402 collectively serve as the Capstone experience for Animal and Veterinary Sciences students. This course fulfills a Writing Intensive requirement.

**Credit hours: 2**

**Prerequisites:** Senior Standing and ENG 315 or ENG 317; or instructor's permission to take ENG concurrently

**Mode of instruction:** In-person course, or video conference course for off-campus students

**Time:** Synchronous

**Digital services, Hardware, Software:** Brightspace, Zoom

**Instructional material:** There is no required text for this class. Reading material will be provided as electronic journal articles or readings. Accommodations to class format or material available as needed.

**Class format:** Combination of lectures, class discussions, and open-ended time for activities. Students present their work in class at the end of the semester.

**Course goals:** The student will conduct a research project under the supervision of a faculty member, complete a written project proposal that will explain the project objectives and the context behind the proposal, and present a report to faculty and students. Students completing the general education area of Capstone experience will be able to:

1. Synthesize knowledge, skills, and dispositions gained throughout the student's major concentration of study.
2. Demonstrate competence within the discipline through professional conduct and, as appropriate, critical reasoning, analytical ability, and creativity.
3. Demonstrate effective communication skills.

**Student learning outcomes and objectives to meet them:**

At the conclusion of this course, student will have the skills to perform the following numbered tasks. Course objectives specific to each learning outcome are provided as lettered explanations.

1. How to find and assess the quality of scientific information.

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- a. In assembling background information about their topic, students will learn how to perform a search of scientific databases, how to read scientific literature, and how to assess information for validity and generalizability.
- b. In peer-reviewing other student research proposals, students will learn how to peer-reviews manuscripts, including reviewing, editing, and scientific critique.
2. How to create a research proposal.
  - a. In developing the written research proposal, students will learn how to present information in a logical and scientific manner, how to “pitch” a project idea, and how to explain their process and controls to ensure the project is rigorously designed.
  - b. In developing the written research proposal, students will learn how to build a citation database and use it to create relevant in-line citations and a bibliography.
3. How to conduct research.
  - a. Through their participation in research under the guidance of a faculty mentor, students will learn broadly about scientific research, including ethical standards and institutional approval, identifying research questions and hypotheses to test, designing robust experiments which incorporate experimental controls to test the hypotheses, data collection and curation, data analysis and evaluation, statistical validity, and interpretation of results.
4. How to present scientific information.
  - a. Students will learn how write a scientific project report, including how to format documents according to a pre-specified scientific format, how to incorporate instructor and peer-review comments and revisions, and how to progress the maturity of concepts and writing with each successive draft. (Writing Intensive objective)
  - b. Students will learn how to present results, including graphs and statistics, accurately and in ways which promote scientific communication skills.
  - c. Students will learn how to create an oral presentation using software tools and present to a technical audience.

### **Project selection:**

The project should reflect the University of Maine Capstone experience goals:

1. The experience must be of significant depth and require innovation, creativity, reflection and synthesis of prior learning;
2. The experience must result in a thesis, report, presentation, or performance that demonstrates mastery of the subject matter
3. Faculty/student interaction should be an integral part of the experience.
4. Minimum student effort in the capstone should reflect the equivalent of three credits of work
5. Interdisciplinary experiences and opportunities for group participation in the capstone experience should be encouraged.

Generally, the Senior Paper research topic should not be the same as that required for any other University of Maine course. Students performing research for the UMaine Student Symposium organized by the Center for Undergraduate Research (CUGR) can use the same research for these classes. Students in the Honors Program may use their honors research project to satisfy the proposal requirements of AVS 401 and will present their results as part of the requirements for AVS 402. However, the final papers in AVS 401 and 402 will be arranged differently to the Honors thesis.

Students will be presented with a list of possible projects that can be carried out in the short time that we have available or you can suggest your own project area and title. Projects suggested by students will need instructor approval and you will need to find a faculty advisor for your project.

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Research projects that involve sampling or data collection from vertebrate animals will need IACUC approval and you will need to complete the required IACUC training on the Humane Care and Use of Animals, which is available on their website (<https://umaine.edu/research-compliance/animal-care/>). The IACUC protocol review form should be completed by the student with the assistance of their project advisor and submitted to IACUC as early as possible in the semester. If your training is more than four years old you must complete the new training ASAP. Instructions are available on the IACUC website under "Required Training."

Research projects that involve human subjects or data collection from humans will need IRB approval (Institutional Review Board for the Protection of Human Subjects). Senior research projects conducted within the framework of the senior capstone experience are considered research and must be reviewed and approved by the IRB. The IACUC/IRB is a significant process that can take several months to get approval, so start early. For questions, contact the IRB Office, <https://umaine.edu/research-compliance/human-subjects/>.

**Attendance policy:** Students are expected to attend lectures, but it is understood that life often precludes this and that students may be performing field work or are located off-campus. Students may attend class virtually, through Zoom, which will be offered for each class. Students who will miss a significant number of classes, or who require additional accommodations, may contact me to make alternate arrangements.

- Pregnancy, lactation, and parenting: I am happy to make accommodations for students based on pregnancy, lactation, and parental needs, as well as work with the Office of Equal Opportunities. Maine state and UMaine policy allows students to breastfeed in any space, including in class. If a lactation space is required, please contact E.O. for arrangements. Pregnant on Campus Initiative, pregnancy and parenting resources in Orono <https://pregnantoncampus.studentsforlife.org/campus/umaine-orono/>
- Food insecure? Need clothes? Check out the Black Bear Exchange's Food Pantry: <https://umaine.edu/volunteer/black-bear-exchange/> or Old Town Crossroads Ministry.

**Class participation:** Students are expected to participate in discussions in class. I strive to create inclusive discussions, but if students still find it challenging to participate please notify me and I will alter the discussion format as needed.

**Late Assignments:** Assignments will be accepted after the deadline, with a 10% reduction in grade per day. Assignments will not be accepted after the final exam slot for this class.

**Classroom policy:** Supporting inclusion and community is an active process that involves both invitation, and support to ensure that the learning community is and remains an equitable and inclusive place. Students are expected to conduct themselves in a professional and courteous manner, and abide by University policies.

**Campus Policies:** "The University of Maine is an EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities." Follow the links for more information.

[Academic Honesty Statement\\*](#)

[Students Accessibility Services Statement\\*](#)

[Course Schedule Disclaimer\\*](#)

[Observance of Religious Holidays/Events\\*](#)

[Sexual Discrimination Reporting \(Long\)\\*](#)

[Sexual Discrimination Reporting \(Short\)\\*](#)

**\*\* I am a "mandatory reporter"**. If you disclose something to me, I am obligated to disclose to the relevant campus Title IX office. This includes information revealed in class assignments.

**Assignments and Assessment:**

<b>10 points (5 pts each)</b>	<i>Quizzes</i> – Short readings and quizzes will be available on Brightspace: <ul style="list-style-type: none"> <li>• “Types of scientific writing” and “Plagiarism”</li> </ul>
<b>1 point</b>	<i>Literature search</i> - Students will be responsible for reviewing the relevant literature to include the most recent information. The completed literature search will form an essential part of the written project proposal this semester. The SFA library liaison will assist students in conducting appropriate searches. The literature that students gather in their search will be used to compile the “Background” section of their proposal. <p>The graded portion of this assignment will be a short submission of a weblink to Brightspace. Students will identify a scientific journal relevant to their project, find the “Instructions for Authors” page online, which details the recommended citation style and manuscript outline/layout for that journal. Students will submit a link to that page for the grade, and will use that format when drafting their written proposal.</p>
<b>4 points</b>	<i>Project summary</i> – Submit ~150 word abstract/summary of the project, including 1 - 2 lines each about the research problem and background, the hypothesis or research question being posed, a brief listing/explanation of the methods or analysis to be used. If applicable, include a sentence about the impacts of the anticipated results of the project.
<b>45 points (15 pts for each draft)</b>	<i>Project proposal</i> - Based on published literature, on ideas supplied by the advisor and on available facilities, each student will prepare an outline of the research work to be conducted in the form of a written project proposal. This proposal is to be written as if you were trying to obtain grant funding to support this research. Information on the structure and content of different types of project/grant proposals will be given in class. <p>Formatting guidelines: Make sure that you carefully review both the style guidelines and the style used in the article from your chosen journal to ensure that the style elements listed above are correct in your own paper. You must include at least: page numbers, line numbers, double spacing, in-line citations in the body of the proposal, a bibliography with consistent formatting, and section headers. An appropriate grading rubric will be made available to you.</p> <p>Editing and successive drafts: Three drafts of this proposal will be submitted over the semester. Since this is a writing intensive class, these drafts will be returned to you as quickly as possible for revision and resubmission by the end of semester. For each successive submission, students will incorporate revisions from their faculty advisor, the instructor, and for two of the drafts, the peer review comments. Hopefully, students will progress the complexity of the scientific content and the maturity of the writing style with successive drafts. The proposal in AVS 401 will form the basis of the final paper in AVS 402, thus any effort you put in now will be rewarded with less effort needed later.</p>
<b>20 points (10 pts each)</b>	<i>Peer review</i> – Students will perform two blind reviews (no student names included on the project) of another student’s research proposal. Details on performing a review will be provided in class, but generally reviewers should comment on how well the information is presented: if the proposal makes sense, if the scientific approach is laid out clearly, as well as spelling, grammatical, for formatting corrections you notice.
<b>5 points</b>	<i>Elevator Speech</i> – Give a 3-min, non-technical summary of your project or topic, as you would to someone who has a passing interest in your work. You will be timed and stopped at 3 min. You can use notes, but don’t prepare any slides or visuals. The goal of the elevator speech is to describe your project conversationally, to get someone interested.
<b>15 points</b>	<i>Oral presentation</i> – you will be required to create a 12-minute oral presentation of your project proposal and present to the class at the end of the semester. This will outline the portions of your written proposal. You will receive feedback from your peers. An appropriate grading rubric will be made available to you on Brightspace.

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**Grading (out of 100 points):** A = 93–100; A– = 90–92; B+ = 87–89; B = 83–86; B– = 80–82; C+ = 77–79; C = 73–76; C– = 70–72; D+ = 67–69; D = 63–66; D– = 60–62; F = 0–59. The completion of both AVS 401 and 402 with grades of C minus or higher is required for graduation.

### Lecture schedule (D2x 1H15):

Day	Wk	No.	Title, Objective, Assignments
T 9/1	1	Intro	Introduction to the course, explanation of the syllabus and course expectations, finding course materials.
T 9/1	1	1	<p>“<i>What is a research project?</i>”</p> <p>An introduction to the scientific method, different types of research, and different types of literature.</p> <ul style="list-style-type: none"> <li>➤ <b>Discussion:</b> “Why do we care about research if we aren’t going to be scientists?”</li> <li>➤ <b>Quiz (5 pts):</b> “Types of scientific writing” Available on Brightspace, ~ 30 min of time, have 1 week to complete.</li> </ul>
R 9/3		2	<p>“<i>Conducting ethical research</i>”</p> <p>Institutional review, ethical conduct, and study guidelines.</p> <ul style="list-style-type: none"> <li>➤ <b>Action Item:</b> Identify a faculty mentor for your project. Notify instructor of the faculty’s name and rough title for the project.</li> <li>➤ <b>Action Item:</b> Perform the online training for IRB or IACUC if you are participating on a project involving human/animal subjects.</li> </ul>
T 9/8	2	3	<p>“<i>How to read a scientific article.</i>”</p> <p>The finer points of reading articles, assessing the quality of information, and gleaning actual results from speculation.</p> <p><b>Quiz (5 pts):</b> “What is plagiarism?” Available on Brightspace, ~ 30 min of time, have 1 week to complete.</p>
R 9/10		4	<p>“<i>Conducting a literature review</i>”</p> <p>What a literature review, when you would need one, and how to go about condensing information from many sources. Citations styles and citation manager software.</p> <ul style="list-style-type: none"> <li>➤ <b>Assignment (5 pts):</b> Identify a scientific journal online that is relevant to your project, and access the Instructions for Authors page. Submit the weblink on Brightspace, and use this as a guideline for your formatting and citation style.</li> <li>➤ <b>Action Item:</b> Start compiling and reading scientific literature</li> </ul>
T 9/15	3	5	<p>“<i>The proposal writing process: experimental design</i>”</p> <p>An overview of research funding, and composing a proposal, with the focus on experimental design, background, and the difference between hypotheses, goals, aims, and objectives. How to present your idea so that others can follow it. How to condense information in your writing and “stack” citations, writing in third person.</p>
R 9/17		6	<p>“<i>The proposal writing process: project management</i>”</p> <p>More on composing a proposal, with the focus on budgeting, timelines, project roles, and minor aspects, including data management, information dissemination and outreach, equipment, and facilities. How to show you can handle this project/role.</p>
T 9/22	4	7	<p>“<i>Giving a scientific presentation</i>”</p> <p>The finer points on structuring scientific presentations, and tricks to avoid being nervous.</p>
R 9/24		8	<ul style="list-style-type: none"> <li>➤ <b>Assignment due (5 pts):</b> Project Summary, 150 words. Submit on Brightspace.</li> </ul>
T 9/29	5	9	<p>Class held, give elevator speeches</p> <ul style="list-style-type: none"> <li>➤ <b>Assignment due in class (5 pts):</b> Elevator Speeches</li> </ul>

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R 10/1		10	Class TBD, if we need more time to give elevator speeches
T 10/6	6	11	No class
R 10/8		12	No class ➤ <b>Assignment due (15 pts):</b> First draft of proposal, submit on Brightspace ➤ <b>Assignment:</b> You will be assigned another student's proposal to perform a peer review, due in two weeks. Submit your review to Brightspace.
T 10/13	7		<i>Fall break, no class</i>
R 10/15			No class
T 10/20	8		No class
R 10/22			No class ➤ <b>Assignment due (15 pts):</b> Peer review, submit on Brightspace
T 10/27	9		No class
R 10/29			No class
T 11/3	10		No class
R 11/5			➤ <b>Assignment due (15 pts):</b> Second draft of proposal due, submit on Brightspace
T 11/10	11		No class
R 11/12			No class
T 11/17	12		No class
R 11/19			<b>Possibly meet for Presentations (pending how many we need to have this semester)</b>
T 11/24	13		<b>Possibly meet for Presentations (pending how many we need to have this semester)</b>
R 11/26			<i>Thanksgiving, no class</i>
T 12/1	14		<b>Presentations</b>
R 12/3			<b>Presentations</b>
T 12/8	15		<b>Presentations</b>
R 12/10			<b>Presentations</b>
F 12/11			➤ <b>Assignment due (15 pts):</b> Final Draft of Project Proposal Due, submit on Brightspace

Relevant books of interest for this class include:

- Scientific Writing and Communication, Papers Proposals and Presentations, by Angelika H. Hofmann, Oxford University Press, 2<sup>nd</sup> ed. 2014, 728 pages, about \$40 from Amazon. This is a very well written book with comprehensive coverage of everything in the title including separate sections on manuscripts, grant proposals, posters and presentations and on job applications.
- Writing and Presenting Scientific Papers by Malmfors, Garnsworthy, and Grossman, Nottingham Univ. Press, 2003, 2<sup>nd</sup> ed. Cost about \$36 from Amazon. This book also contains chapters on the various aspects of writing papers and on making oral presentations, visual displays, and posters.
- How to Write and Publish a Scientific Paper, 7th ed. By Robert A. Day and Barbara Gastel, Oryx Press. Cost is also about \$40. This book was first released in 1979 but is an excellent text.
- How to Write and Publish a Scientific Paper, 8th ed. By Barbara Gastel and Robert A. Day, Oryx Press. Cost was only \$33 from Amazon.
- Writing in the Biological Sciences by Angelika H. Hofmann, Oxford University Press, 2<sup>nd</sup> ed. 201, only 330 pages, also only about \$33 from Amazon.