

## WILD 470 – Conservation of Wildlife Populations

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**PROFESSOR:**

Dr. Angie Luis, [Angela.Luis@umontana.edu](mailto:Angela.Luis@umontana.edu)

Office: Forestry 207A

Office Hours: Wednesdays, 1-1:50, or by appointment

**TA:**

Maddy Jackson, [madeline.jackson@umontana.edu](mailto:madeline.jackson@umontana.edu)

Office Hour: Tuesdays 1-1:50

Location: Forestry 207

**REQUIRED READINGS:**

Conservation of Wildlife Populations, 2<sup>nd</sup> edition, by L. Scott Mills

- Chapters for each class shown in brackets

Additional readings to be assigned

**CLASS MEETING TIMES:**

Most weeks:

MWF 12:00-12:50 Health Science (HS) 207

R 1:00-2:50 Gallagher Building (GBB) 213

**CLASS STRUCTURE:** This class is pretty mathy and partially flipped to allow for more time to practice and get help with difficult concepts and practice problems. About one lecture's worth of material a week will be asynchronous online on Moodle that needs to be completed before class on Monday.

**COURSE OBJECTIVES:** By the end of the course students should understand how we measure populations (abundance/density) and demographic rates (birth, death, immigration, emigration), what affects populations, and how we manage/conserves populations. Students will gain proficiency with quantitative methods in population ecology including various types of population models and several ways to estimate population processes. Additionally, students will demonstrate their understanding of the scientific method and proficiency of scientific writing.

**TENTATIVE SCHEDULE** (check Moodle for updates)

|     |   |    |  |
|-----|---|----|--|
| Aug | Mon   | 28 | The Big Picture  |
|     | Wed   | 30 | <b>No in-person class [Moodle Lesson 1]</b>            |
|     | Thurs   | 31 | <i>Lab 1: Intro to R</i>                               |
| Sep | Fri   | 1  | <b>No in-person class [Moodle Lesson 1]</b>            |
|     | Moodle  |    | <i>Stats Review [Ch. 2]</i>                            |
|     | Mon   | 4  | <b>No Class, Labor Day</b>                             |
|     | Wed   | 6  | Likelihood [Ch. 2]                                     |
|     | Thurs   | 7  | <i>Lab 2: Standard Error and Deviation</i>             |
|     | Fri   | 8  | AIC [Ch. 2]  |
|     | Moodle  |    | <i>Estimating abundance [Ch. 4]</i>                    |
|     | Mon   | 11 | Estimating abundance [Ch. 4]                           |
|     | Wed   | 13 | CMR abundance - Lincoln Peterson [Ch. 4]               |
|     | Thurs   | 14 | <i>Lab 3: Population Estimation (Lincoln-Peterson)</i> |
|     | Fri   | 15 | Survival [Ch.4]  |
|     | <b>Annotated Bibliography Due</b>                           |    |  |
|     | Moodle  |    | <i>Survival &amp; Reproduction</i>                     |
|     | Mon   | 18 | Survival [Ch. 4]                                       |
|     | Wed   | 20 | Review for Exam  |
|     | Thurs   | 21 | <i>Lab 4: Hypotheses &amp; Predictions</i>             |
|     | Fri   | 22 | <b>EXAM I</b>  |
|     | Moodle  |    | <i>Exponential Population Growth [Ch. 5]</i>           |
|     | Mon   | 25 | Exponential Population Growth [Ch. 5]                  |
|     | Wed   | 27 | Exponential Population Growth [Ch. 5]                  |
|     | Thurs   | 28 | <i>Lab 5: Exponential Growth</i>                       |
|     | Fri   | 29 | Matrix population models [Ch. 6]                       |
|     | <b>Hypotheses and Predictions for Research Proposal Due</b> |    |  |
|     | Moodle  |    | <i>Matrix population models [Ch. 6]</i>                |
| Oct | Mon   | 2  | Matrix population models [Ch. 6]                       |
|     | Wed   | 4  | Matrix population models [Ch. 6]                       |
|     | Thurs   | 5  | <i>Lab 6: Matrix Models I</i>                          |
|     | Fri   | 6  | Matrix population models [Ch. 6]                       |
|     | Moodle  |    | <i>Sensitivity Analysis &amp; Variation [Ch. 6]</i>    |

|     |         |       |   |
|-----|---------|-------|---|
|     | Mon     | 9     | Matrix population models [Ch. 6]                    |
|     | Wed     | 11    | Loggerhead Sea turtle Matrix example                |
|     | Thurs   | 12    | <i>Lab 7: Matrix Models II</i>                      |
|     | Fri     | 13    | Review for Exam                                     |
|     | Moodle  |       | <i>Density Dependence [Ch. 7]</i>                   |
|     | Mon     | 16    | <b>EXAM II</b>                                      |
|     | Wed     | 18    | Density Dependence [Ch. 7]                          |
|     | Thurs   | 19    | <i>Lab 8: Peer Review</i>                           |
|     | Fri     | 20    | Density Dependence [Ch. 7]                          |
|     | Moodle  |       | <i>Density Dependence &amp; Predation [Ch. 7,8]</i> |
|     | Mon     | 23    | Predation [Ch. 8]                                   |
|     |         |       | <b>Draft of Hypotheses &amp; Methods Sections</b>   |
|     | Wed     | 25    | Predation [Ch. 8]                                   |
|     | Thurs   | 26    | <i>Lab 9: Density Dependence</i>                    |
|     | Fri     | 27    | Predation [Ch. 8]                                   |
|     | Moodle  |       | <i>Disease</i>                                      |
| Nov | Mon     | 30    | Predation [Ch. 8]                                   |
|     | Wed     | 1     | Genetic variation & fitness [Ch. 9]                 |
|     | Thurs   | 2     | <i>Lab 10: Writing Lab</i>                          |
|     | Fri     | 3     | Metapopulations & Ecological Traps [Ch. 10]         |
|     | Moodle  |       | <i>Connectivity [Ch. 10]</i>                        |
|     | Mon     | 6     | Exercises   |
|     | Wed     | 8     | Review for Exam                                     |
|     | Thurs   | 9     | <b>EXAM III</b>                                     |
|     | Fri     | 10    | <b>No Class, Veteran's Day</b>                      |
|     | Moodle  |       | <i>Human perturbations on populations [Ch. 11]</i>  |
|     | Mon     | 13    | Invasive Thistle Exercise                           |
|     | Wed     | 15    | Harvest Management [Ch. 14]                         |
|     | Thurs   | 16    | <i>Lab 11: Small Population Conservation</i>        |
|     | Fri     | 17    | Harvest Management [Ch. 14]                         |
|     |         |       | <b>Draft Research Proposal Due</b>                  |
|     | Moodle  |       | <i>Harvest Management [Ch. 14]</i>                  |
|     | Mon     | 20    | Harvest Management [Ch. 14]                         |
|     | Wed-Fri | 22-24 | <b>No Class - Thanksgiving Break</b>                |

|                                    |           |  |
|------------------------------------|-----------|--|
| <i>Moodle</i>                      |           | <i>Focal Species [Ch. 12]</i>          |
| Mon                                | 27        | Harvest Management 3 [Ch. 14]          |
| <b>Proposal Reviews Due</b>        |           |  |
| Wed                                | 29        | Harvest exercises                      |
| Thurs                              | 30        | Lab 12: Harvest                        |
| Dec                                | Fri       | 1 Extinction Vortex [Ch. 12]           |
| Mon                                | 4         | Population Viability Analysis [Ch. 12] |
| Wed                                | 6         | Adaptive Management [Ch. 14]           |
| <b>Final Research Proposal Due</b> |           |  |
| Thurs                              | 7         | No lab                                 |
| Fri                                | 8         | Final Exam Review                      |
| <b>Thurs</b>                       | <b>14</b> | <b>Final Exam 8-10am</b>               |

**GRADING:** Grades will be based on 3 mid-term exams, a final, lab exercises, online activities & lessons, and a written research proposal (with multiple parts). Late lab assignments will be penalized 10% for each day late. Grades will be kept up to date on Moodle.

| percentage           |        | pts                                    | When |        |
|----------------------|--------|--|------|--------|
| Exams                | 45%    | Exam 1                                 | 100  | Sep-22 |
|                      |        | Exam 2                                 | 100  | Oct-16 |
|                      |        | Exam 3                                 | 100  | Nov-9  |
|                      |        | Final                                  | 140  | Dec-15 |
| subtotal             |        | 440                                    |      |        |
| Labs                 | 23%    | 12 labs @ 20 pts each<br>(drop lowest) | 220  | weekly |
| Online<br>Activities | 11%    |  | 110  | weekly |
| Proposal             | 21%    | Annotated Bibliography                 | 20   | Sep-15 |
|                      |        | Hypotheses/Predictions                 | 20   | Sep-29 |
|                      |        | Draft Sections                         | 30   | Oct-23 |
|                      |        | Full Draft                             | 10   | Nov-17 |
|                      |        | Reviews                                | 20   | Nov-27 |
|                      |        | Final Proposal                         | 100  | Dec-6  |
| subtotal             |        | 200                                    |      |        |
| total points         | 100.0% |  | 970  |        |

**MOODLE LESSONS:** Every Monday there will be a Moodle lesson due before class. Moodle lessons cover basic concepts and terms to free up class time for more active learning, application of knowledge, and examples. Moodle lessons may consist of multiple content pages with associated quiz questions. Check the progress bar to make sure you have completed the whole lesson. Moodle lessons will usually be worth 6-8 points.

**RESEARCH PROPOSAL:** Each student is required to prepare a research proposal on a topic of their choice related to wildlife population ecology. The proposal should include an introduction to the topic, hypotheses and predictions, research methods, expected results, implications, and literature cited. The proposal must also include a budget. The length of the proposal including all sections is 8 pages, double-spaced with 12-point font (5-6 pages text + cover letter, references, and budget). The full proposal assignment will be broken down into a few sub-assignments, including an annotated bibliography, Hypotheses and Predictions (as bullet points), a draft of the Hypothesis Section and the Methods Section, a full draft, anonymous peer-reviews, and the final proposal. See above for grade break-down and due dates. See Moodle for documents with more details.

**UPPER DIVISION WRITING REQUIREMENTS:** WILD 470 in conjunction with two additional upper division writing courses meets the university upper division writing requirement. WILD 470 specifically meets the following outcomes:

- Identify and pursue more sophisticated questions for academic inquiry
- Find, evaluate, analyze, and synthesize information effectively from diverse sources
- Manage multiple perspectives as appropriate
- Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen discipline
- Use multiple drafts, revision, and editing in conducting inquiry and preparing written work
- Follow the conventions of citation, documentation, and formal presentation appropriate to that discipline
- Develop competence in information technology and digital literacy

**PLAGIARISM:** Plagiarism will not be tolerated and will result in failing the course.

**STUDENT CONDUCT CODE:** All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](#).

**STUDENTS WITH DISABILITIES:** The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability

Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommason 154 or 406.243.2243. I will work with you and DSS to provide an appropriate modification.

**BASIC NEEDS:** Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Office for Student Success (sarah.swager@umontana.edu or (406) 243-5225) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable her to provide any resources that she may possess.

**GRADING OPTION:** Please note, this class is offered for traditional letter grade only, it is not offered under the credit/no credit option.

**DROP DATES:** After registering and through the **first seven (7) instructional days of the semester**, students may use [Cyberbear](#) add courses or change sections and credits; through the **first fifteen (15) instructional days of the semester**, students may use [Cyberbear](#) to drop courses. Fees are reassessed on the sixteenth day of the term. Added courses and credits may result in additional fees. For courses dropped by the fifteenth instructional day, no fees are charged and courses are not recorded. (For deadlines and refund policy for withdrawal from all courses, see the Withdrawal sections of this catalog.)

An instructor may specify that drop/add is not allowed on the internet. A drop/add form is used to make changes in these courses, if approved by the instructor.

**Beginning the sixteenth (16) instructional day of the semester through the forty-fifth (45) instructional day**, course adds & drops require instructor's and advisor's approvals using the Course Add/Change/Drop link in Cyberbear. A \$10.00 processing fee is charged for each drop/add form. Added courses and credits may result in additional fees. There are no refunds or reductions of fees for courses dropped and grades of W (withdrew) are recorded.

**Beginning the forty-sixth (46) instructional day of the semester through the last day of instruction before scheduled final examinations, students must petition to drop.** The petition must be approved by the dean of the student's major as well as the instructor of the course and the student's advisor. A \$10.00 processing fee is charged for each petition. There are no refunds or reductions of fees for courses dropped, and the instructor assigns a grade of WP (withdrew/passing) if the student's course work has been passing or a WF (withdrew/failing) if the course work has been failing. These grades do not affect grade averages but they are recorded on students' transcripts.

Documented justification is required for dropping courses by petition. Some examples of documented circumstances that may merit approval are: accident or illness, family emergency, or other circumstances beyond the student's control.

The opportunity to drop a course for the current term for such a course ends on the last day of instruction before scheduled final exams. Dropping a course taken in a previous term or altering grading option or audit status for such a course is not allowed. The only exceptions are for students who have received a grade of NF (never attended).