OKLAHOMA STATE UNIVERSITY
Department of Natural Resource Ecology and Management
Fall 2016

NREM 3012 - Applied Ecology and Conservation Laboratory - SYLLABUS

I. Course Information:

Meeting Location: Ag Hall 019

Day/Time:  
Section 1 - Tuesday 1:30-5:20 pm  
Section 2 – Wednesday 1:30-5:20 pm  
Section 3 – Thursday 1:30-5:20 pm

Instructors:

Dr. Scott Loss
Email: scott.loss@okstate.edu  
Phone: 405-744-4607  
Office Location: 544 Ag Hall

Caitlin Laughlin (Teaching Assistant – Section TBD)  
Corey Riding (Teaching Assistant – Section TBD)  
Dray Carl (Teaching Assistant – Section 3)

Office hours:  
Dr. Loss (by appointment)  
TA’s (To be determined)

II. Course Materials:

There is no text book or lab manual for the course. Class activities will be based on a series of stand-alone lab exercises. There will also be an assigned reading in some weeks.

III. Course Description:

Understanding how “textbook” ecological principles apply to on-the-ground resource management and conservation is central to becoming a successful Natural Resource Ecologist. Equally important is gaining field experiences that clarify links between principle and practice and expose students to a scientific inquiry based perspective to understanding ecological interactions. This class will cover a variety of ecosystems (from prairies to woodlands to waters) and ecological scales (from individuals to ecosystems), and we will implement a variety of data collection techniques that can be used to investigate ecological interactions. The overarching theme of the class will be to teach students how to take a scientific inquiry-based approach to ecology and conservation. Components of this scientific approach include: noticing and describing patterns from field observations, developing questions and hypotheses based on observations and data, designing sampling and data collection approaches to address questions/hypotheses, collecting, analyzing, and summarizing data in writing, and drawing conclusions and making recommendations. Gaining the perspective of a scientific investigator-ecologist is beneficial to students regardless of their future career in natural resource ecology and management.
IV. Course Objectives:

1. Students will see field examples of how ecological principles inform on-the-ground conservation and management of natural resources.

2. Upon course completion, students will have been exposed to all components of the scientific method and will understand the basics of experimental design and methods for ecological studies. Specifically, students will be able to:
   - Devise testable research questions and hypotheses based on field observations and data.
   - Have a basic understanding of common pitfalls that can be encountered when designing studies and data collection protocols.
   - Collect data and conduct basic graphing and analysis to identify patterns and evidence that contribute to answering research questions and addressing hypotheses.
   - Based on all of the above steps, draw conclusions about research questions and support for hypotheses, identify data limitations, and identify management implications and follow-up research questions.

3. Students will gain experience with many field methods that are useful for collecting data to understand ecological interactions.

4. Students will gain experience working in a team to conduct field research.

V. Teaching Approach:

The course will be taught at the junior level with the expectation that students have already been introduced to the major branches of NREM through earlier coursework. The class will be broken into several modules with each module either 1 or 2 weeks long. In each module, we will first become familiar with an ecosystem, habitat, and/or community of interest through a preliminary field “lecture” and training on data collection exercises. Worksheet assignments completed between sessions 1 and 2 of each 2-week module will prepare students for more independent data collection in week 2. Following completion of each week 2 session, a more formal lab report based on the data collection exercise will be produced prior to the beginning of the next class module. For 1-week lab modules, there will be a mix of worksheets and formal reports due the following week.

Because this may be students’ first experience writing formal lab reports, we will also teach basic report writing skills, and templates will be provided for the first report assignment with students led toward increasing independence in writing throughout the semester. Some class time will also be devoted to introducing key concepts related to hypothesis development, study design, and basic data analysis and interpretation, and what constitutes sufficient evidence for drawing conclusions, making management recommendations, and identifying further research needs. Students will be encouraged toward an increasing level of independence in each lab module, and the culmination of the class will be a multi-week module where students work in groups to conduct a more substantial independent research project addressing an ecological question of their choosing in one of the ecosystems previously visited. The lab report from the final project will serve as the final exam for the class.
VI. Assignments

*Lab worksheets:* These worksheets will be completed between sessions 1 and 2 of each 2-week lab module (and in some cases, after 1-week lab modules). These will be take-home worksheets designed to: (1) get you to think in more detail about the system introduced during that week, (2) encourage formulation of potential research questions for the ecosystem/process of interest, and (3) encourage preparation for the week 2 activities (for 2-week lab modules).

*Lab reports:* More formal summary reports based on data collected during class and to be submitted upon completion of all 2-week lab modules and some 1-week modules.

*Group independent research project:* Students will work in groups during the final multi-week module to conduct independent projects that address a research question with direct application to management of a particular species, habitat, or ecosystem. The project will be completed in one of the study systems worked in during an earlier module and will be based on a research question of the group’s choosing. In addition to the final report, there will also be a project proposal assignment that will form a component of the final project grade (the proposal will include a draft of the research question and study design/data collection approach, etc.).

VII. Evaluation:

*Standards:* Grade structure is A-F. The grade achieved depends on demonstrated level of mastery and understanding of course content.

*Grading scale:*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A –</td>
<td>Superior, substantial mastery of course content</td>
<td>90 to 100</td>
</tr>
<tr>
<td>B –</td>
<td>Good, excellent understanding of course content</td>
<td>80 to 90</td>
</tr>
<tr>
<td>C –</td>
<td>Average, understands course content</td>
<td>70 to 80</td>
</tr>
<tr>
<td>D –</td>
<td>Minimal, some increased knowledge</td>
<td>60 to 70</td>
</tr>
<tr>
<td>F –</td>
<td>Failing, lack of effort, no change in knowledge</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

*Components of grade (note that late assignments will receive zero credit):*

<table>
<thead>
<tr>
<th>Task</th>
<th>Total Value</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>20%</td>
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<tr>
<td>Respectful participation, asking of questions,</td>
<td>10%</td>
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<tr>
<td>and contribution to discussions</td>
<td></td>
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<tr>
<td>Lab worksheets (4 total)</td>
<td>15%</td>
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<tr>
<td>Lab reports (4 total)</td>
<td>30%</td>
</tr>
<tr>
<td>Independent research project</td>
<td>25%</td>
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<tr>
<td><strong>Total:</strong></td>
<td><strong>100%</strong></td>
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</table>
**Attendance Policy and Other Expectations:**

**Attendance and tardiness:** This course meets only once a week and in most weeks, we will be heading into the field shortly after the beginning of course periods. **Therefore, attendance and on-time arrival to class are critical.** After one absence of any type, all absences (even excused absences) will result in proportionally reduced attendance scores. This equates to a one “free absence” policy, but please note that, due to the field-based nature of the course, missing a class will make it much more difficult to complete the week’s assignment. The instructor and TA’s can help answer specific questions related to missed classes, but it is not our obligation to re-lecture students for missed material.

**General Expectations:** Read any assigned readings prior to class; ask questions, provide insights, and participate in discussions related to the week’s exercises; turn in lab worksheets and reports on time (late assignments receive 0 credit); use D2L and frequently check university email, but note that the instructors have no obligation to check and respond to email after 6:00 p.m., and do not expect an instantaneous response after hours or on weekends.

**Academic Misconduct:** Although we encourage collaborative discussion and exchange of ideas among students, plagiarism will not be tolerated. The lab worksheets and reports must be your original writing (or for group work, the original effort of your collective group), and for writing assignments that are applicable, you must put all ideas into your own words and cite references for facts and ideas that are not your own. If it is determined that a student has engaged in plagiarism, he or she will be given an “F” grade for the course and may face additional sanctions from the University including expulsion. **Even copying a single sentence or definition from a website, textbook, or other source without putting it into your own words is plagiarism and has resulted in corrective actions being taken previously in this course.** See the OSU Student Code of Conduct for further details: studentconduct.okstate.edu/code.

**Disabilities or special needs:** Students with disabilities or special needs requiring accommodation are urged to notify the instructor of this circumstance during the first week of class. You should also contact OSU Student Disability Services with at least two weeks advanced notice to ensure accommodations: 405-744-7116 (phone).

**Course Calendar:** See the following page for a detailed calendar of events for the course.

**Weather:** Because the class is primarily conducted in the field, inclement weather may force an adaptation of the overall schedule and of weekly activities and assignments. However, unless dangerous weather occurs (e.g., lightning in the vicinity), we will likely continue with the planned class schedule, so prepare accordingly. In the past two years, the temperature during the course has ranged from 28 to 103 degrees, so prepare to deal with a wide variety of conditions.

**Safety:** There are several issues related to entering into the field for coursework, including heat/dehydration, biting/stinging insects, lightning, and so forth. Although, instructors will ensure that we do not enter or stay in the field under unsafe conditions, there are additional steps that students must take to ensure their safety. By far the most dangerous condition we will encounter is sun and heat, which can (and has) lead to heat exhaustion and heat stroke. Because of issues in the past, students will be required (with no tolerance) to wear appropriate dress for the conditions and to bring at least 32 ounces of water to each class. For more information, see the field safety slideshow on the D2L page.
VIII. Course Calendar (I reserve the right to revise the calendar)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date (week of)</th>
<th>Topic</th>
<th>Reading/Assignment Due (beginning of each class period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 15</td>
<td>Hand out syllabus (AGH 019)</td>
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<tr>
<td>2</td>
<td>Aug 22</td>
<td>Introduction to ecology and scientific inquiry (AGH 019)</td>
<td>Due: View Field Safety powerpoint</td>
</tr>
<tr>
<td>3</td>
<td>Aug 29</td>
<td>Patch Burn/Heterogeneity Lab (OSU Research Range)</td>
<td>Due: Read Weir et al. 2013</td>
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<tr>
<td>4</td>
<td>Sept 5</td>
<td>Red cedar/Hydrology Lab (Cross Timbers Ecological Research Station)</td>
<td>Due: Patch Burn Lab Report</td>
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<td>5</td>
<td>Sept 12</td>
<td>Oak Savannah Management/Overstory-Understory Lab (Lake Carl Blackwell)</td>
<td>Due: Red Cedar worksheet</td>
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<tr>
<td>6</td>
<td>Sept 19</td>
<td>Fisheries Ecology Lab – Session 1 (Lake Carl Blackwell)</td>
<td>Due: Oak Savannah Lab Report</td>
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<tr>
<td>7</td>
<td>Sept 26</td>
<td>Fisheries Ecology Lab – Session 2 (Lake Carl Blackwell)</td>
<td>Due: Fish Ecol Worksheet</td>
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<tr>
<td>8</td>
<td>Oct 3</td>
<td>Vector-borne Disease Lab – Session 1: Birds (Location TBD)</td>
<td>Due: Fish Ecol Lab report</td>
</tr>
<tr>
<td>9</td>
<td>Oct 10</td>
<td>Vector-borne Disease Lab – Session 2: Ticks (Location TBD)</td>
<td>Due: Vector-borne Disease Worksheet</td>
</tr>
<tr>
<td>10</td>
<td>Oct 17</td>
<td>Invasive Earthworm Lab – Session 1 (Cross Timbers Ecological Research Station)</td>
<td>Due: Invasive Earthworm Worksheet</td>
</tr>
<tr>
<td>11</td>
<td>Oct 24</td>
<td>Independent Research Lab – Session 1 (AGH 019) – Selection of project/study design working session</td>
<td>Due: Independent research question and study design draft</td>
</tr>
<tr>
<td>12</td>
<td>Oct 31</td>
<td>Invasive Earthworm Lab – Session 2 (Cross Timbers Ecological Research Station)</td>
<td>Due: Independent research data entry and summary</td>
</tr>
<tr>
<td>13</td>
<td>Nov 7</td>
<td>Independent Research Lab – Session 2: Data collection working session (Lake Carl Blackwell)</td>
<td>Due: Invasive Earthworm Lab Report</td>
</tr>
<tr>
<td>14</td>
<td>Nov 14</td>
<td>Independent Research Lab – Session 3: Data collection working session (Lake Carl Blackwell)</td>
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<tr>
<td>15</td>
<td>Nov 21</td>
<td>NO CLASS – THANKSGIVING WEEK</td>
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<tr>
<td>16</td>
<td>Nov 28</td>
<td>Independent Research Lab – Session 4: Data analysis, interpretation working session (AGH 019)</td>
<td>Due: FINAL PROJECT</td>
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<tr>
<td>Finals</td>
<td>Dec 5</td>
<td>FINALS WEEK</td>
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