Course description
Biological control is the deliberate manipulation of natural enemies to control pests in natural and managed systems. This course explores the theory and application of biological control of insects and weeds. We will focus on the ecological factors that underlie to the success of classical and conservation approaches to biological control of pests.

Course Objectives
1. Students will be able to evaluate the relative merits and drawbacks of a classical biological control program.
2. Students will be able to design a conservation biological control program.
3. Students will be able to design a biological control research program for an invasive species.

Course Philosophy
My goal as an instructor is to develop the critical thinking skills of students in my class. My approach is to use the Socratic Method, which is widely considered to be the oldest and most effective way of developing critical thinking. In this teaching style, the instructor holds back from directly giving student answers, and instead challenges assumptions, goals, understanding, and examining for contradictions within a scenario.

Readings
- Additional readings will be posted on Blackboard

Course Structure
The course consists of readings, discussions, short lectures, in-class exercises, exams and presentations. The exams will be based upon the books and lectures and will be primarily held on Tuesdays.

Participation
Each week, on Thursdays, we will discuss one paper from the primary literature. Each undergraduate student will be expected to read and lead the discussion on the paper twice
over this semester. Undergraduate students will be assigned in groups of two or three to lead the discussion, while Graduate students will be expected to lead discussions by themselves.

Students that are not leading the discussion will still be expected to participate in class discussions, which will contribute to their overall course participation grade. I will be looking for evidence that each student has read the paper. If you show up but do not speak during discussion, I will assume that you have not read the paper and you will get half the number of Participation points.

Course Evaluation
Final grades will be based upon leadership in discussion, participation in discussions, and the term paper. The grading scale will proceed as follows: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F ≤ 60% of total points.

Late Policy: Five points will be deducted for each day that an assignment is late. No homework will be accepted after 3 days.

Graduate students will be expected to develop a more extensive project after consultation with the instructor. They will also be expected to present two background chalk-talks.

Last day for add/drop, audit, pass/no pass changes: Jan 27
Last day to withdraw: March 28

<table>
<thead>
<tr>
<th>Grading:</th>
<th>Undergraduate</th>
<th>Graduate</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Participation</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Homework + peer review</td>
<td>60</td>
<td>60</td>
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<td>Quizzes</td>
<td>100</td>
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<td>Midterm Exam</td>
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<tr>
<td>Final Exam</td>
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<td>100</td>
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<tr>
<td><strong>Total Points:</strong></td>
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Expectations
1. Students are expected to follow the UVM student code of conduct
2. Attendance is mandatory and students are expected to participate in the class.
3. No cell phone or laptop use in the classroom.
4. Five points will be deducted for each day an assignment is late. Assignments will not be accepted after 3 days unless you have excused absences from Rose Laba in the CALS Student Services Division or the student services staff person for your college.
5. In order to be accepted, homework assignments need to be printed out and brought in person to class.
6. Any misconduct will result in disciplinary action.
Major questions

Lecture (Tuesdays. Readings from Van Driesche et al. 2008)

A. What are the merits and drawbacks of a classical biological control program?
   1. Why is biological control needed?
      • The invasion crisis
      • Ways to suppress invasive species
      • Classical biological control

B. How do we design a research program biological control for an invasive species?
   1. How does the biology of a species contribute to its effectiveness as a biological control agent?
      • Parasitoid diversity and ecology
      • Predator diversity and ecology
      • Weed biocontrol agent diversity and ecology
   2. How does biological control work?
      • Interaction webs as a the conceptual framework for classical biological control
      • Population biology and population models
      • Classical biological control
      • Weed biological control
   3. What are the methods for developing a classical biological control program?
      • Methods for Classical biological control
      • Non-target impacts of biological control agents
      • Predicting natural enemy host ranges
      • Assessing natural enemy impacts

B. How do we design a conservation biological control program?
   • Protecting natural enemies
   • Enhancing crops as natural enemy environments

Readings

1. Are multiple natural enemies more effective than a single natural enemy for controlling insect pests?
     http://dx.doi.org/10.1016/S1049-9644(02)00002-6

2. **What is the importance of natural enemy biodiversity for conservation biological control?**


Student Questionnaire
PSS 232

Name___________________________________________

Year___________________________________________

Major__________________________________________

Why are you taking this class?

What are you hoping to learn in this class?

What are you interested in doing after you graduate?