Experiments in Ecology (Bio 51)

2014 Course Schedule and Syllabus

Instructors:
Dr. Jan Pechenik, Course Coordinator
Dana 223, x73199, jan.pechenik@tufts.edu
Office hours: by appointment (email me with 3 times that work for you)

Dr. George Ellmore
Barnum 205, x73188, george.ellmore@tufts.edu
Office hours: Wed and Thurs 5-6 PM

Dr. Francie Chew
Barnum 107, x73189, frances.chew@tufts.edu
Office hours: Tues 12 noon – 2 PM or by appointment (email several times that work for you)

Teaching Assistants:
Kelsey Graham
Barnum 216D, kelsey.grahamh@tufts.edu
Office hrs: Tuesdays 10 AM – noon

Charles Van Rees
Barnum 216B, cbvanrees@tufts.edu
Office hrs: TBD

Meeting Times: Tuesdays 4:30-5:20 pm in Barnum 114 for joint discussion session, and either Wednesdays (Sec. A) or Thursdays (Sec. B) 1:30-5:00 pm in Barnum 208 for lab sessions. The Wednesday and Thursday afternoon classes are likely to run longer on weeks that involve field trips (see schedule below). Make sure to plan your fall schedules accordingly. Please contact Dr. Jan Pechenik if you have any questions.

ATTENDANCE (FOR LAB SESSIONS AND FOR DISCUSSION SESSIONS) IS MANDATORY. YOU WILL NOT BE ALLOWED TO SWITCH LAB SECTIONS AFTER THE START OF THE SEMESTER. Dress appropriately for field conditions on days that you will be doing fieldwork.

Course Goals: To teach you a variety of techniques from contemporary ecology, and to provide a substantial research context for their use. Each of you will leave the course with experience in: 1) taxonomic identification of organisms, 2) framing research questions, 3) designing experiments, 4) censusing populations, 5) analyzing data, and 6) presenting data both orally and in writing. For each unit, you will be oriented to some general aspects of a particular problem. Then you will work in small groups to investigate specific research questions, some of which may be your own. Finally, your group members will present their results to the class, and you will submit individual, written research reports.

Text: A Short Guide to Writing about Biology, 8th edition by Jan A. Pechenik; additional papers to be assigned.

Course Requirements and Grading:

- 3 Partial Research Papers ……………………… 30% (10% each)
- 3 Group Oral Presentations ……………………. 30% (10% each)
- 1 Final Complete Research Report …………. 20%
- 3 Reading Responses …………………………… 15% (5% each)
- Participation ……………………………………. 5%

The Final Complete Research Report that you submit at the end of the term will be based on only one of the three units (hermit crab behavior—Pechenik; plant resources and phenotypic plasticity—Chew; or sensory ecology of forest trees—Ellmore). This report is more comprehensive than the other reports that you turn in, and it will require library research. When you turn this report in, you must also include the previous two drafts (partial report with TA comments and partial report with instructor comments). NOTE: partial and final papers submitted late will lose ½ letter grade per day.

Each instructor will assign readings for their Unit; assignments and discussions will focus on those readings.
### Unit 1: Marine Hermit Crabs (Professor Pechenik)

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<th>Day</th>
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<th>Activity</th>
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<tr>
<td>Sun</td>
<td>Sept 7</td>
<td>Field trip to Nahant. Meet in Barnum 114 at 1:45 PM for 2 PM departure. Low tide is at 4 PM, so we should be back at Tufts between 6 and 6:30 PM. Don’t wear good shoes! Read pp. 150-155 (Taking field notes) in Pechenik’s <em>Short Guide</em> before the trip.</td>
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<tr>
<td>W</td>
<td>Sept 3</td>
<td>No lab this week</td>
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<tr>
<td>Th</td>
<td>Sept 4</td>
<td>No lab this week</td>
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**2 T Sept 9**
- Reading Response I due. Also Read pp. 34-44 in *The Short Guide* prior to class
- Workshop on Methods. Review of class field data.

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<tr>
<td>W</td>
<td>Sept 10</td>
<td>Class lab research study—assign students to groups for next week</td>
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<td>Th</td>
<td>Sept 11</td>
<td>Class lab research study—assign students to groups for next week</td>
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**3 T Sept 16**
- Review of class field data; graphical data representation & statistical analysis. Read about statistics in the *Short Guide* (pp. 49-68) prior to class.
- Small Group independent research study

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<tr>
<td>W</td>
<td>Sept 17</td>
<td>Small Group independent research study</td>
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<tr>
<td>Th</td>
<td>Sept 18</td>
<td>Small Group independent research study</td>
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**4 T Sept 23**
- 1) Revisit Graphing & Data Analysis
- 2) Prepare Unit 1 oral presentations (30 min) (Read pp. 232-242 in *The Short Guide* before class)

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<tr>
<td>W</td>
<td>Sept 24</td>
<td>Unit 1 Oral Presentations—Pechenik</td>
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<td>Th</td>
<td>Sept 25</td>
<td>Unit 1 Oral Presentations—Pechenik</td>
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**Due by noon Monday September 29 in your TA’s mailbox:** Draft of Partial Research Paper on Unit 1 (Pechenik)—Title, Methods, Results, Acknowledgements, & Literature Cited (Read pp. 158-193 in *The Short Guide* before completing this assignment)

**Oct 1, 2: Pechenik:** Marked Draft Research Papers will be returned to students at the start of class.

### Unit 2: Plant Resources & Phenotypic Plasticity (Professor Chew, interleaved with Unit 3 fieldwork)

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<tr>
<td>5 T</td>
<td>Sept 30</td>
<td>The forest of phytophenolics (Ellmore); assign Reading II for Oct. 7</td>
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<tr>
<td>W</td>
<td>Oct 1</td>
<td>Field Trip to Ward Reservation layered forest landscape (Andover MA) -Ellmore</td>
</tr>
<tr>
<td>Th</td>
<td>Oct 2</td>
<td>Field Trip to Ward Reservation layered forest landscape (Andover MA) -Ellmore</td>
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**6 T Oct 7**
- Intro to Phenotypic Plasticity, Plant Resources & Competition (Chew)
- Small group projects planning Reading Response II due

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<tr>
<td>W</td>
<td>Oct 8</td>
<td>Field trip &amp; small groups projects in Middlesex Fells (Chew)</td>
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<td>Th</td>
<td>Oct 9</td>
<td>Field trip &amp; small groups projects in Middlesex Fells (Chew)</td>
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**Due by noon Friday October 10 in Pechenik mailbox:** Final Version of Unit 1 Partial Research Paper.

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<tr>
<td>7 T</td>
<td>Oct 14</td>
<td>Navigating dichotomous keys (Ellmore)</td>
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<tr>
<td>W</td>
<td>Oct 15</td>
<td>Campus Trees, Preston Keys, choose one please (Ellmore)</td>
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<tr>
<td>Th</td>
<td>Oct 16</td>
<td>Campus Trees, Preston Keys, choose one please (Ellmore)</td>
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8 T Oct 21 Planning for plant phenotypic plasticity experiments in Unit 2
W Oct 22 Root growth & competition experiments; preliminary analysis of fieldwork data
Th Oct 23 Root growth & competition experiments; preliminary analysis of fieldwork data
9 T Oct 28 Planning for lab experiment data collection
W Oct 29 Measuring plants and plant roots, data wrangling
Th Oct 30 Measuring plants and plant roots, data wrangling

10 T Nov 4 Preparing for oral presentations Assign Reading Resp III for Nov 18.
W Nov 5 Mini-symposium (Chew)
Th Nov 6 Mini-symposium (Chew)

Due by noon Monday November 10 in TA’s mailbox: Draft of Partial Research Paper (Chew) on Unit 2—Title, Introduction, Results, Acknowledgments, & Literature Cited

Nov 12, 13: Marked Pechenik Partial Research Papers will be returned to students.

Due by noon Monday November 17 in Chew mailbox: Final Version of Unit 2 Partial Research Paper on Plant Resources & Phenotypic Plasticity(Chew)

Unit 3: Sensory Ecology of Forest Trees (Professor Ellmore)

11 T Nov 11 No Recitation: Veteran’s Day
W Nov 12 Total phenolics from single and from sequential infusions of Tea
Th Nov 13 Total phenolics from single and from sequential infusions of Tea

12 T Nov 18 Discussion; Reading Response III due.
W Nov 19 Team testing of Tea processing, seasonality, varietals
Th Nov 20 Team testing of Tea processing, seasonality, varietals

[T, W Th Nov 25-27 No Class - Thanksgiving Break]

13 T Dec 2 Prepare presentations; final Full Research Paper assignments made
W Dec 3 Mini-Symposium on drivers of phenolic profiles in Tea trees
Th Dec 4 Mini-Symposium on drivers of phenolic profiles in Tea trees

Due by Monday Dec 1 in TA’s mailbox: Draft of Partial Research Paper on Unit 3 (Ellmore) — Title, Results, Discussion, Acknowledgements, & Literature Cited
Dec 3, 4: Marked Draft Research Papers will be returned to students at the start of class.

Due by noon Monday Dec 8 in Ellmore mailbox: Final Version of Unit 3 Research Paper

Available Monday October 27: Graded Unit 1 Partial Research Paper on hermit crabs biology from Dr. Pechenik

Available Monday November 24: Graded Unit 2 Partial Research Paper from Dr. Chew.

Available Wed Dec 10: Graded Unit 3 Partial Research Paper from Dr. Ellmore

Due noon Monday December 15: Final Complete Research Paper (give to Eileen Magnant, Dept. Secretary, Dana 120)

Note: Classes end Monday Dec 8; Reading period is December 9-10, examination period ends December 18