

**Seminar in Insect Biogeography**  
**Fall 2018**  
**ENY 6934, Section 255B**  
**1 credit**

**Instructor:** Dr. Keith R. Willmott  
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**Class period:** Thursday, period 7 (13:55 - 14:45)

**Room:** Entomology-Nematology EYN 2218

**Office hours:** Please make an appointment, or drop by my office any time.

**Course Description:** This course is a seminar course designed to meet Department of Entomology & Nematology core course requirements. Seminar courses give students practice in preparing and presenting a 30-40 minute seminar on a topic that interests them. Master's students are required to take one credit of seminar and PhD students take two credits. This seminar focuses on insect biogeography.

Insects dominate biological diversity, yet large-scale patterns in their distribution, diversity and abundance, and the processes responsible for such patterns, remain poorly understood. Biogeography is the study of such patterns and processes and is an exciting and rapidly evolving field, integrating systematics, ecology and evolution with geography, geology and climatology. This seminar course will provide an overview of major themes in biogeography, including historical biogeography and evolution, latitudinal and elevational gradients in species richness, patterns of abundance and range-size (macroecology), island biogeography and species-area relationships, and applications of biogeography to conservation. Classes will consist of a combination of lectures, discussions of primary scientific literature and student seminars, during which we will explore how studies of insects have improved or could inform our understanding of biogeography in general.

**Objectives and Goals:**

- Learn about major themes in insect biogeography research.
- Learn about major methodological challenges and conceptual issues in the field, including defining areas of endemism, methods for assessing historical area relationships, molecular clocks and spatial autocorrelation.
- Encourage broader thinking and develop expertise and confidence in critical reading of journal articles.
- Gain practice in synthesizing, summarizing and presenting a research topic through a 30-40 minute review seminar.

**Topics to be covered:**

Introductory lectures in the first five classes will focus in particular on methodological and conceptual issues to provide a background for discussion of papers during the course. Topics will include how to define areas of endemism, historical biogeographic methods, molecular clocks and spatial autocorrelation.

Each week we will also read and discuss several papers from the primary scientific literature, depending on the scheduling of lectures and student seminars. A student will be chosen at random to lead the discussion on each paper. Students will be encouraged to read papers critically, thinking about the study group and/or region and resultant implications, considering whether the methods used are the most appropriate and adequate, asking whether the results fully support conclusions, and discussing how the study could have been improved. While prior knowledge of specific methods and systems is not expected, students should be prepared to think about broader aspects and introduce topics for discussion in class.

All students are expected to research and present one seminar on a preferred topic. Students will be assigned a week to give their seminar based on their topic preferences, and must read and synthesize papers relevant to that week's theme, different to those designated for class reading. These papers could offer contrasting opinions on a particular topic, or address a similar topic using different study groups or methods, or provide complementary information to one another. Selection of topics will take place in the first class and the first student seminar will take place from week 6 (September 27) onwards. Students in the audience will also be expected to participate in class discussion following the seminar.

Students should show evidence in their seminars that they have read at least 4 papers while researching their topic and their seminars should last approximately 30-40 minutes.

**Prerequisites:** Biogeography is a broad field and a multi-disciplinary approach is essential. There are thus no prerequisites other than a keen interest in and at least some background knowledge of ecology, evolution and biodiversity, and willingness to participate actively in classes.

**Textbook:** None

**Course outline:**

Subject to change. The general outline for each week will ideally apply to both lectures and student seminars.

#### *Introduction and background*

Week 1. Lecture 1: Historical overview of biogeography and macroecology. What is biogeography? Development of biogeographical thought, from a static to a dynamic Earth. Role of biogeography in studies of evolution. Landmark developments in the field.

#### *Area, distribution and speciation*

Week 2. Lecture 2: Defining Areas of Endemism. Meaning and delimitation of areas, cluster analyses and patterns of turnover. Discussion: Geography and speciation.

Week 3. Lecture 3: Area relationships. Cladistic biogeography and parsimony analysis of endemism. Discussion: Areas of endemism.

Week 4. Lecture 4: Molecular clocks. Sources of error and calibration. Discussion: Vicariance and dispersal: 1.

Week 5. Lecture 5: Spatial autocorrelation. Measuring spatial autocorrelation using Moran's index. Accounting for spatial autocorrelation using Mantel tests. Discussion: Vicariance and dispersal: 2.

*Macroecology: patterns of diversity and other ecological attributes*

Week 6. Discussion/student seminar: The mid-domain model and its value in understanding gradients in species richness.

Week 7. Discussion/student seminar: Spatial patterns in species richness 1: the role of history.

Week 8. Discussion/student seminar: Spatial patterns in species richness 2: the role of environment.

Week 9. Discussion/student seminar: the relationships among abundance, range size and range position.

Week 10. Discussion/student seminar: island biogeography – colonization, extinction, turnover and adaptive radiation.

Week 11. Discussion/student seminar: the relationship between area and species diversity.

*Applications to conservation*

Week 12. Discussion/student seminar: predicting extinction from ecological traits and habitat loss.

Week 13. Discussion/student seminar: prioritization of areas for conservation using species richness, endemism, threat and complementarity.

Week 14. Discussion/student seminar: climate change and conservation.

**Assignments and Methods by which the Student will be Evaluated and Grades**

**Determined:**

- Present a 30-40 minute seminar on a topic of interest chosen from a list provided during first class meeting (50%).
- Provide one journal article for reading and facilitate discussion of the article in class following the seminar (15%).
- Attendance is mandatory at all class periods; every student should read the assigned journal articles critically and come prepared to discuss them, and one student will be selected each week at random to facilitate class discussion (35%).

**Grading:** This course will be graded on the following scale.

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	60-69
E	<60

**Critical Dates for Exams or Other Work:** Student presentations will begin on September 27. Students will be assigned a week to present based on their topic preferences.

**Policy Related to Class Attendance:** Attendance is mandatory.

**Policy Related to Make-Up Exams or Other Work:** Missed presentations cannot be made up except in the case of prior excused absence or family or medical emergencies.

**Class Demeanor Expected by Instructor:** Students should be considerate, polite, open-minded, objective and show interest in the work of others. Turn off cell phones before coming into classroom.

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**Additional General Information:** The following information applies to all courses at the University of Florida.

**We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standard of honesty and integrity.**

**Academic Honesty:** As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

**Copyrighted Materials and Software Use:** All students are required and expected to obey the laws and legal agreements governing copyrighted material and software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

**Accommodations for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

**University Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.