

## **Term Information**

Effective Term Spring 2017

## **General Information**

Course Bulletin Listing/Subject Area Evol, Ecology & Organismal Bio  
Fiscal Unit/Academic Org Evolution, Ecology & Org Bio - D0390  
College/Academic Group Arts and Sciences  
Level/Career Undergraduate  
Course Number/Catalog 2410  
Course Title Biological Invasions: The Ecology and Evolution of Species Introductions  
Transcript Abbreviation Biol Invasions  
Course Description Invasion ecology is the study of introduced, non-native species and the factors that sometimes lead to their population explosions and negative ecological impacts in the new region. This course will make explicit connections between fundamental concepts in ecology and evolutionary biology, topics specific to invasion ecology, and the idiosyncratic details surrounding particular invasive species.  
Semester Credit Hours/Units Fixed: 3

## **Offering Information**

Length Of Course 14 Week  
Flexibly Scheduled Course Never  
Does any section of this course have a distance education component? No  
Grading Basis Letter Grade  
Repeatable No  
Course Components Lecture  
Grade Roster Component Lecture  
Credit Available by Exam No  
Admission Condition Course No  
Off Campus Never  
Campus of Offering Columbus

## **Prerequisites and Exclusions**

Prerequisites/Corequisites None  
Exclusions None

## **Cross-Listings**

Cross-Listings

## **Subject/CIP Code**

Subject/CIP Code 26.0701  
Subsidy Level Baccalaureate Course  
Intended Rank Freshman, Sophomore, Junior, Senior

## Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

## Course Details

### **Course goals or learning objectives/outcomes**

- Differentiate between commonly (mis)used terms used to describe introduced species.
- Describe the major stages of, and barriers to, invasion success.
- Describe major hypotheses used to explain invasion success.
- Understand and explain fundamental concepts in ecology and evolutionary biology in the context of species invasions.
- Critically assess claims regarding invasive species from the media.

### **Content Topic List**

- Introduction: Definitions, history, stages of invasion
- Transport vectors and pathways
- Propagule pressure
- Establishment success: abiotic influences
- Establishment success: biotic influences
- Space and time: spatial spread and temporal patterns
- Ecological impacts: competition and predation
- Ecological impacts: ecosystem-level impacts and theory of impacts
- Evolution of invaders: bottlenecks, population genetic diversity
- Evolution of invaders: hybridization, natural selection, plasticity
- Management: prediction, risk assessment and control
- Global change and invasion

## Attachments

- BiologicalInvasionsSyllabus.doc: Syllabus  
*(Syllabus. Owner: Johnson, Norman F)*
- LearningGoals.xlsx: Learning Goals  
*(Other Supporting Documentation. Owner: Johnson, Norman F)*
- ConcurrencesRequested.pdf: Concurrences Requested  
*(List of Depts Concurrence Requested From. Owner: Johnson, Norman F)*
- HorticultureCropScience\_Concurrence.pdf: Hort Crop Science concurrence  
*(Concurrence. Owner: Johnson, Norman F)*
- EEOB2410\_concurrence\_Entomology.pdf: Entomology concurrence  
*(Concurrence. Owner: Johnson, Norman F)*
- Geography\_concurrence\_EEOB 2410.pdf: Geography concurrence  
*(Concurrence. Owner: Johnson, Norman F)*
- CoverLetter.pdf: Cover letter  
*(Cover Letter. Owner: Johnson, Norman F)*

## Comments

## Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Johnson,Norman F	08/31/2016 08:51 AM	Submitted for Approval
Approved	Johnson,Norman F	08/31/2016 08:54 AM	Unit Approval
Approved	Fink,Steven Scott	08/31/2016 10:02 AM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole	08/31/2016 10:02 AM	ASCCAO Approval



Department of Evolution, Ecology and Organismal Biology

College of Arts and Sciences  
Division of Natural and Mathematical Sciences  
1315 Kinnear Road  
Columbus, OH 43212-1157

Phone (614) 292-2730  
Fax (614) 292-7774

31 Aug 2016

We're pleased to submit this request for a new course designed by one of the department's newest faculty, Dr. Steve Hovick. This course deals with a topic of current importance, biological invasions. It is intended for a broad audience of students, extending beyond those in STEM fields. I have requested concurrences from four departments; as of today I have yet to hear back from SENR (although the chair of the school has confirmed receipt of the request). I look forward to comments from the committee's deliberations.

Sincerely,

A handwritten signature in black ink, appearing to read 'Norman F. Johnson', with a long horizontal flourish extending to the right.

Norman F. Johnson  
Moser Chair in Arthropod Biosystematics & Biological Diversity  
Associate Chair, EEOB  
Chair, EEOB Curriculum Committee

# BIOLOGICAL INVASIONS: THE ECOLOGY AND EVOLUTION OF SPECIES INTRODUCTIONS (EEOB 2410; 3 cr.)

## COURSE DESCRIPTION

Invasion ecology is the study of introduced, non-native species and the factors that sometimes lead to their population explosions and negative ecological impacts in the new region. In this course, we will make explicit connections between fundamental concepts in ecology and evolutionary biology, topics specific to invasion ecology, and the idiosyncratic details surrounding particular invasive species. My goals for the course are to emphasize the ecological and economic importance of species invasions and to use the often-fascinating case studies from invasion biology to illustrate ecological and evolutionary principles.

By the end of this course, you should be able to:

1. Differentiate between commonly (mis)used terms used to describe introduced species.
2. Describe the major stages of, and barriers to, invasion success.
3. Describe major hypotheses used to explain invasion success.
4. Understand and explain fundamental concepts in ecology and evolutionary biology in the context of species invasions.
5. Critically assess claims regarding invasive species from the media.

## REQUIRED TEXTS

Elton, CE. 2000. *The Ecology of Invasions by Animals and Plants*. University of Chicago Press.  
 Lockwood, JL, MF Hoopes and MP Marchetti. 2013. *Invasion Ecology, 2nd edition (selected chapters)*.  
 Wiley-Blackwell.

## Additional Required Readings

Additional readings will supplement the course textbooks and will be accessible in the "Course Content" section of Carmen. Each week you should review the content posted on Carmen for that week. Content will be listed by date and by topic, which coincides with the schedule in the syllabus. You will be tested over material in the textbook as well the additional required course readings.

## COURSE ASSIGNMENTS

There are 500 total points for this course. The following is a list of assignments and the points allocated for each. You may view your grades (including scores for discussion participation) on Carmen. The final grade posted on Carmen will serve as the final grade. Grades will not be rounded up, but I will offer an opportunity for extra credit during the semester.

## Midterm & Final Exam (30%, 150 points)

This class will have both a midterm (75 points) and a final exam (75 points). The midterm exam will cover topics from the first half of the class while the final will be comprehensive, covering information from throughout the semester. You will be tested on information from all aspects of the course (course readings, lectures and class

### Instructor

Steve Hovick, PhD  
 Assistant Professor  
 Dept. of EEOB  
 316 Aronoff Labs  
 hovick.2@osu.edu  
 (614) 247-7662

### Office Hours

TBD

### Class Meeting Times

Tues/Thurs, time TBD  
 Location TBD

discussions) and will be provided with a study guide and an in-class review to help you prepare. Exams may be multiple choice, true/false and/or short essay.

### Case Study Paper (20%, 100 points)

You will write a paper focused on the biology and ecology of a single non-native species (or group of closely related, ecologically similar species) of your choosing, based on peer-reviewed scientific literature. The objectives of this exercise will be to familiarize yourself with important characteristics of the species relating to its biology, the ecological role it plays in both the native and introduced regions, and the factors that facilitated its introduction to and establishment in the introduced region (referring to one or more of the major invasion hypotheses we've covered during the course). You will also be asked to identify key unanswered questions or areas of conflict in the literature regarding invasion success for which additional study would be useful.

Final Grade	Percentage
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+	67-69%
D	60-66%
E	Less than 60%

### Case Study Poster Presentation (10%, 50 points)

Sharing research results with a larger audience is a critical component of the scientific process. You will prepare and present a poster and accompanying brief oral presentation to share your findings from the Case Study Paper (above) with your fellow classmates and other invitees in a poster session held at the end of the semester. You will be assessed based on your poster and oral explanation of your findings (40 points), as well as engagement with other students about their work (10 points). This is an opportunity to share your findings with others in the community plus to compare and contrast your system with systems on which your peers have chosen to focus.

### Invaders in the News (20%, 100 points)

Introduced and/or invasive species are commonly mentioned in the news and popular press. Some well-known examples that you may be familiar with already include invaders in the Great Lakes (e.g., Asian carp, zebra mussels, *Phragmites*), pythons in the Florida everglades, cane toads in Australia, and garlic mustard in forests throughout much of temperate North America. Over the course of the semester, you will identify three (3) examples of introduced species in the news and prepare a brief written summary of the story and why it is (or is not) important from an ecological and societal perspective (20 points each  $\times 3 = 60$  points). For one of these three stories, you will dig deeper into the specific claims made in the article and prepare a brief report that assesses the extent to which those claims are justified based on peer-reviewed scientific literature on the topic (40 points). The objective of this final exercise is to think critically about how invasive species are portrayed in the popular press and assess how well those outlets tend to interpret scientific evidence for the general public.

### Service-learning engagement (10%, 50 points)

For the service-learning component of this course, you are expected to volunteer eight (8) hours of your time with Franklin County Metro Parks on a project related to invasive species (40 points) and write a reflection on your experiences (10 points). Your volunteer hours can be focused on invasive species management, research or some combination of both. A planned field day (and make-up rain date) will be announced early in the semester for which your full participation would fulfill the service-learning hours requirement. During the field day, we will initiate a new long-term research project in collaboration with Metro Parks staff that will include

invasive both species management and monitoring. If you are unable to attend the field day, you can fulfill the hours requirement by making your own arrangements with Metro Parks staff who work with invasive species; more details about this alternative will be provided in class.

### **Attendance (10%, 50 points)**

With the exception of workshop and exam review days, I will generally take attendance every class period using Top Hat. Top Hat is online system whereby you use your phone, tablet or laptop to acknowledge your class attendance. Days that attendance will be taken are noted with an “a” on the course schedule. Please note that there are 25 days where attendance will be taken, each day worth 2 points. *You may miss up to TWO classes without a loss of attendance points. After that, you will lose two points for every class (noted with an “a” on the course schedule) that you miss.* See course policies below for more specific information regarding attendance.

## **COURSE POLICIES**

### **Attendance & Participation**

Attendance is critical in this class and will be taken regularly. Attendance will be taken using the Top Hat system through which you check-in using a personal device. You are responsible for your own check-in, and any attendance or technology issues with the Top Hat system should be addressed as soon as possible. Additionally, if you forget to check-in or you arrive late (after the Top Hat Code has been taken down), you will be counted as absent for that day.

Everyone in the class will have TWO attendance-free days that can be used in the event you need to miss class, for whatever reason. You will not lose attendance points on those days. Absences for university-excused absences or for personal/family illnesses or death (with proper documentation provided) will also not count against you, but only if you let me know beforehand or within 48 hours of missing the class. I will be strict about enforcing this policy given the number of free days you have. Please note on the schedule the days when attendance will be taken.

Each day you miss beyond your two free days will result in a loss of 2 attendance points. Records in Top Hat will serve as the official attendance record. Additionally, if you miss a class you are responsible for getting notes and information missed from your fellow classmates. You may not use a free day to miss an exam or your assigned presentation date; if you are not there for those events you will receive no points on the assignment.

### **Make-up Exams**

Make-up exams will be arranged for university-excused or unavoidable circumstances (e.g., deaths, personal/family illness and emergencies), but only with prior notification and/or written verification within 48 hours of your return. If you are not present in class when the exam is given and do not have the proper documentation, you will not be allowed to make up the exam.

### **Late Assignments**

You will know the due dates for each assignment in advance, thus assignments must be handed in on time. Unless specified, assignments are due at the specified time in the Carmen discussion or drop box.

**Grade Disputes**

Students must wait 24 hours from when a graded assignment is given back before requesting a grade change. Students have **one week** after the graded assignment is returned to challenge grades. After that, grade changes will not be considered. Grade change requests must be sent via email to me. Please outline (be specific) where you believe that you should have received additional points and why. I am happy to revisit grades, but please be sure that your e-mail is written in a clear and respectful manner.

**Technology Use**

During class or team meetings, technology is allowed with discretion. I understand the value of having computer access in the classroom; however, I reserve the right to institute a technology policy if usage becomes problematic or distracting. I also reserve the right to ask everyone to “unplug” or put away technology for the day if I see students using technology for non-class purposes (texting friends, shopping, using social media, doing work for other classes, etc.)

**Plagiarism**

Written work and presentations are to be individually developed. Using another person’s writing, using large verbatim sections of information from the work of another, or using something you have written for another class is considered plagiarism. If unsure, give credit to your source. Students who have plagiarized will be penalized and reported to university officials. A grade of zero will also be given for the assignment.

**Academic Misconduct:**

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

**Accessibility**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health or chronic or temporary medical conditions), please let one of us know immediately so that we can privately discuss options. You also are welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with one of us as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue

**CLASS SCHEDULE (ASSIGNMENT DUE DATES, TBD)**

This schedule includes a list of topics, with readings and assignment due dates to follow. Please note that this schedule is subject to change. If changes are made, an updated syllabus will be posted on Carmen.

Week	Topics
1	Introduction: Definitions, History, Stages of Invasion
2	Transport Vectors and Pathways
3	Propagule Pressure
4	Establishment success: Abiotic influences
5	Establishment success: Biotic influences I
6	Establishment success: Biotic influences II
7	Space and time: spatial spread and temporal patterns
8	Ecological Impacts I: competition and predation
9	Ecological Impacts II: ecosystem-level impacts and theory of impacts
10	Evolution of invaders I: bottlenecks, population genetic diversity
11	Evolution of invaders II: hybridization, natural selection, plasticity
12	Management: prediction, risk assessment and control
13	Global change and invasion
14	Poster session