

## INVASION ECOLOGY (NRC590IE)

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**Instructor:**

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T/TH 10:00-11:15

Holdsworth 308

Office Hours:

Tuesdays, 2:30-4:30 pm

**Course website:** [http://people.umass.edu/bethanyb/Invasion\\_ecol.html](http://people.umass.edu/bethanyb/Invasion_ecol.html)

### COURSE SUMMARY

Invasion ecology explores the introduction, establishment and impact stages of non-native, invasive species. We will consider how invasions differ across taxonomic groups, from plants to fish to pathogens.

### COURSE OBJECTIVES

Invasive species have been identified as one of five primary drivers of global biological change (along with, for example, climate change and land cover change). They outcompete and prey on native species, alter ecosystem function, and reduce native species diversity and abundance.

This course aims to survey pathways of introduction, mechanisms of establishment and invasion, and observed impacts for a range of non-native, invasive species. A large portion of the course will involve working in teams to gather and analyze data and present results. Thus, in addition to content, this course also aims to expand your research, collaboration and presentation skills.

### GRADING

Assignment	Date(s)	Percent of Credit
Reading quizzes	9/4, 9/9, 9/23, 9/25, 10/9, 10/28, 11/4, 11/18, 12/4	10
Mid-term Exam	10/30	25
Team presentations	9/18, 10/7, 10/23, 11/13, 12/2	50
Team assessment of individual contribution		15

A: 93 – 100%

B-: 80 – 82%

D+: 67 – 69%

A-: 90 – 92%

C+: 77 – 79%

D: 63 – 66%

B+: 87 – 89%

C: 73 – 76%

F: below 63%

B: 83 - 86%

C-: 70 – 72%

## SCHEDULE

<b>Section 1: Introduction Pathways</b>	
<u>Date/Topic</u>	<u>Assignments Due</u>
9/2 (T) Review syllabus; Overview	
9/4 (Th) Definitions & stages	<i>*Reading Quiz*</i> <b>Read</b> Mack et al., 2000
9/9 (T) Trade and introductions	<i>*Reading Quiz*</i> <b>Read</b> Hulme et al., 2008
9/11 (Th) <i>Group task 1:</i> Introduction sources	<b>Read</b> Invasive species chapter (taxon specific – see website)
9/16 (T) Introduction sources cont'd	
9/18 (Th) Introduction sources presentations	<b>Team presentations (10 min) on mechanisms of introduction</b>
<b>Section 2: Invasion hypotheses (I)</b>	
9/23 (T) Enemy release	<i>*Reading Quiz*</i> <b>Read</b> Keane & Crawley, 2002
9/25 (Th) Empty niche & disturbance	<i>*Reading Quiz*</i> <b>Read</b> Shea & Chesson, 2002
9/30 (T) <i>Group task 2:</i> Traits	<b>Read</b> Traits (taxon specific – see website)
10/2 (Th) Traits cont'd	
10/7 (T) Traits presentations	<b>Team presentations (10 min) on invasive species traits</b>
<b>Section 3: Invasion hypotheses (II)</b>	
10/9 (Th) Global change interactions	<i>*Reading Quiz*</i> <b>Read</b> Bradley et al, 2010
10/14 (T) NO CLASS – MONDAY SCHEDULE	
10/16 (Th) <i>Group task 3:</i> Invasion hypotheses	<b>Read</b> Hypotheses (group specific – see website)
10/21 (T) Invasion hypotheses cont'd	
10/23 (Th) Invasion hypotheses presentations	<b>Team presentations (10 min) on other invasion hypotheses</b>
10/28 (T) Review of invasion hypotheses	<i>*Reading Quiz*</i> <b>Read</b> Catford et al, 2009
10/30 (Th)	<b>EXAM</b>

<b>Section 4: Spread</b>	
<u>Date/Topic</u>	<u>Assignments Due</u>
11/4 (T) Invasion biogeography	<i>*Reading Quiz*</i> <b>Read</b> Pearson & Dawson, 2003
11/6 (Th) <i>Group task 4:</i> Distribution models	<b>Read</b> Find and read a paper about your target species' physiological limitations - Emerald Ash Borer (Insects); Nutria (Mammals); Burmese Python (Herps); White Nose Syndrome (Pathogens); Silver Carp (Fish); Water Hyacinth (Aquatic Plants)
11/12 (W) <b>**TUES SCHEDULE**</b> Distribution models cont'd	
11/13 (Th) Distribution model presentations	<b>Team presentations (10 min) on target species, current distribution and potential range</b>
<b>Section 5: Impacts</b>	
11/18 (T) Impacts across taxa	<i>*Reading Quiz*</i> <b>Read</b> Wilcove et al., 1998; Clavero & Garcia-Berthou, 2005
11/20 (Th) <i>Group task 5:</i> Impacts	<b>Read</b> Impacts (taxon specific – see website)
11/25 (T) Impacts cont'd	
11/27 (Th) NO CLASS - THANKSGIVING	
12/2 (T) Impacts presentations	<b>Team presentations (10 min) on types of impacts</b>
12/4 (Th) Management implications, review & evaluation	<i>*Reading Quiz*</i> <b>Read</b> Mack et al., 2000

## Reading Quizzes

On lecture days (9/4, 9/9, 9/23, 9/25, 10/9, 10/28, 11/4, 11/18, 12/4), there will be a very good chance of a quiz prior to the discussion. The quiz question will be based on a dice roll following the lecture (no quiz if there's no question for the number rolled). Quiz questions are posted next to the readings on the course website. You are likely to see some of these questions again on the mid-term exam.

## Mid-Term Exam

The mid-term exam will be comprehensive of all materials covered through 10/28. **This includes information in the readings**, as learning through reading is a critical skill in science. The exam will focus on concepts rather than specific facts and will consist of short answer questions.

## **Team Presentations**

There will be a total of five team presentations throughout the semester. These presentations, as well as your participation in your teams, make up the large majority of your grade in this class.

Each presentation will be delivered by one team member, with every team member presenting at least once. Presentations can be no longer than 10 minutes and must be delivered using powerpoint.

Team grades will be primarily based on the content (including use of examples), organization and clarity of the powerpoint slides. Team grades will be secondarily based on the content and delivery of the presenter. *It is in your best interest to make sure your teammates do a good job of presenting!* On the day that you are your team's presenter, your grade will be primarily based on your spoken content and delivery and secondarily based on the content of the slides.

I will provide a suggested format and grading rubric for the presentations in advance.

## **Team Assessment of Individual Contribution**

During the semester, you will have the opportunity to grade each of your teammates on their overall contributions during the semester. How your teammates view your contribution to team research activities and development of presentations will affect your overall grade. *It is in your best interest to come to class prepared and ready to support your team.*