

## AS.420.611: Principles and Methods of Ecology

Advanced Academic Programs  
Zanvyl Krieger School of Arts and Sciences  
Johns Hopkins University  
Baltimore, Maryland, USA

### Section 1: Instructor, Course Information, and Objectives

#### Instructor Information

*Instructor:* Jorge A. Santiago-Blay, Ph.D.

*Email Address:* blayj@jhu.edu

*Office Hours:* via email

#### Course Description

This course examines the relationship between organisms and their biotic and abiotic environments at three levels of biological hierarchy: individual organism, population, and community. Population characteristics, models of population dynamics, and the effect of ecological interactions on population regulation are discussed in detail. The structure and function of natural and man-made communities and the impact disturbances have on community structure are also examined. Students are led to appreciate the importance of ecology in solving environmental problems.

#### Prerequisites

420.301 - Quantitative Methods - This prerequisite course provides the necessary background in mathematics for students who do not have sufficient undergraduate course work in calculus and statistics. Students who receive a provisional admission because of math deficiency can opt to take the mathematics assessment test. If the student earns a score of 80% or better, then s/he is not required to take the course. In this course, students acquire quantitative skills and an understanding of mathematical principles fundamental to environmental sciences, and necessary for evaluating the implications of policy measures. Topics include probability and statistics, systems of equations, analytical geometry, and basic concepts of calculus. Problem sets, interpretation of data, and applications to everyday problems help students appreciate the usefulness of quantitative methods. Offered online twice a year.

420.302 - Chemistry of Natural Processes - This course provides students with a basic understanding of the fundamentals of chemistry, of Earth's interrelated chemical systems, and of how to manipulate and interpret chemical data. Topics include molecules and chemical bonding, states of matter, thermodynamics, and kinetics. Through a series of exercises, students apply chemistry principles to solve real-world environmental problems. Prerequisite: Students are urged to take 420.301 Quantitative Methods for Environmental Sciences before enrolling in this course. Offered online only, one to two times annually.

## Course Learning Goals & Learning Objectives

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

1. Describe how interactions of organisms with their environment and other organisms give rise to patterns of species distribution and abundance.
2. Describe biotic and abiotic factors affecting ecological processes at the individual, community and ecosystem levels.
3. Explain the major processes influencing biodiversity in terrestrial and aquatic ecosystems.
4. Define basic principles of ecology including population growth, ecological interactions, succession, and evolutionary change, and make predictions based on these principles.
5. Discuss how the function of local and global ecosystems is being altered by human activity, and critique alternative strategies for minimizing human impact on biogeochemical cycles.
6. Conduct basic field and analytical techniques in ecology such as habitat sampling and physiochemical characterization of populations and communities.
7. Demonstrate familiarity with common approaches for statistical analysis and presentation of ecological data.
8. Apply ecological principles to environmental challenges and conservation concerns.

## Section 2: Course Materials

### Textbook

Bowman, W. D. S. D. Hacker, and M. L. Cain. 2017. *Ecology*. Fourth Edition. Sinauer Associates. Sunderland, Massachusetts, USA. 594 pp. ISBN-13: 978-160-535-6181. For those of you desiring a more thorough review of basic ecological principles, this book will be a valuable resource.

### Other Readings

All other readings will be posted on the online classroom with the support from JHU Library Reserves. To access the eReserves, simply click on the eReserves tab in Blackboard located on [https://blackboard.jhu.edu/webapps/ATLS-AresCourseReserves-bb\\_bb60/view.jsp?course\\_id=160169\\_1&mode=cpview](https://blackboard.jhu.edu/webapps/ATLS-AresCourseReserves-bb_bb60/view.jsp?course_id=160169_1&mode=cpview).

### Other equipment / software/ websites / online resources

1. Several “hands on” exercises and questions will be assigned in coordination with our class textbook and alignment with the learning objectives. The link to that site is: <http://sites.sinauer.com/ecology4e/index.html>

2. Also, we will complete several of the SimBio Virtual Labs using a program called SimUText. Our SimUText will include the following modules:

- a. Niche Wars
- b. Isle Royale
- c. The Barnacle Zone
- d. The Intermediate Disturbance Hypothesis
- e. Top Down Control
- f. Keystone Predator
- g. Patchy Prairies
- h. Understanding Population Growth Models

Labs cost is \$6/each/student, which means the total cost for the seven labs selected it is \$42/student. You will purchase your subscription and download the software using SimBio's Student Portal. To subscribe to your SimUText, you will need to supply your email address as a user name, your name and student ID, and select a password. The bookstore does not offer a SimUText Redemption Code so just click the Continue button. Once you have registered and purchased your subscription, you can download the software from this site.

To do:

1. It is important that you review the information below before you subscribe to the SimUText for Principles and Methods of Ecology at Johns Hopkins University. **To avoid potential problems, do not wait until the last minute.**
2. CHECK YOUR TECH! Visit <https://simutext.zendesk.com/hc/en-us/categories/200170134-Check-Your-Tech-> to confirm that the SimUText application will work on your computer, and/or to explore your options if there is a problem.
3. If you purchased a SimUText Voucher from your bookstore, be sure to have it with you when subscribing, as you will need to enter your voucher code.
4. When you are ready to subscribe and download installers, follow this link to initiate the process: <https://www.simutext.com/student/register.html#/key/UnnX-54b5-pazX-du7m-vnrV>
5. You will need to install the SimUText application onto your computer to complete your SimBio assignments. You can download the installers any time by logging into the online SimUText Student Portal at <https://www.simutext.com/student> .
6. Save this email! Should you encounter problems, you may need your course-specific Access Key. It is: **UnnX-54b5-pazX-du7m-vnrV**
7. Problems or questions? Visit SimUText Support: <http://simbio.com/support/simutext> . **Students are more than welcomed to visit this site and ask specific questions. Expect answers within 24 hours. Again, do not wait until the last day to ask questions!**

### **Other specific technology requirements and skills for this course**

1. You will need access to a spreadsheet such as MS Excel, Apple Numbers, or Google Docs as that will facilitate basic statistical analysis.
2. Learning online requires some basic knowledge of computer technology. At a minimum, you need to be able to:
  - a. Navigate in and use Blackboard; the Blackboard Student Orientation course on your “My Institution” page.
  - b. Create and save MS Word documents; see [MS Word tutorials for PC users \(all versions\)](#); [Word Help](#) for Mac users.

### **Section 3: Course Overview and Learning Goals**

One of the simplest definitions of ecology is “the study of the abundance and distribution of organisms.” In this course, we will explore the physical and the biological features and interactions that determine densities and distributions. A central Learning Goal of ecology is to try to reduce the complexity of the natural world to an oversimplified, yet hopefully still useful, set of principles. This course will provide an understanding of ecological theory and we will critically examine some real-world applications of such theories. Global climate change, overfishing, habitat loss, altered nutrient cycles, and the spread of invasive species are among the world’s pressing global environmental issues. Solutions to these problems are complex, but firmly rooted in the fundamental tenets of ecological theory. Ultimately, students should be able to relate ecological principles to problems of habitat and species conservation, resource and waste management, pest control, and areas of environmental planning.

Each week, you will also have assignments to complete on the online classroom, including quizzes, virtual laboratories, at home live laboratory exercises, and discussion activities. The quizzes will involve multiple choice and short answer questions, and they are designed to get you thinking more deeply about key concepts in the readings.

**What is ecology?** Ecology, as a natural science attempts to explain, interpret and predict nature’s phenomena. Such work often begins with observations obtain in the field which lead to further investigation. As an online class, we will attempt to incorporate the field aspect through virtual laboratories and “at home” data collection as part of an independent research project. Other activities will involve sharing observations and opinions with other students online.

### **Dates & Topics, Readings, and Assessments & Due Dates**

A tentative schedule of dates, topics, associated readings assessments, and due dates can be found in Section 7. Topics may be modified by the me with advanced notice of no less than three days. Should that happen, I will communicate via the online classroom.

### What to do next?

1. Carefully review the remaining sections of the syllabus section of this course before beginning Week 1 activities, which are located in the **Lessons** folder in your online classroom.
2. Once you feel that you are ready to dive into the first week's activities, click on the **Lessons** button on the left-side navigation. Then, click on **Module 1** and begin with the Introduction and Objectives.

### What to Expect in this Course

This course consists of 11 full weeks (Monday – Sunday) and two smaller weeks (“half weeks”, week 1, Wednesday to Sunday and week 13 (the last), Monday to Wednesday), and the course includes individual activities and group discussions. Please review the course syllabus thoroughly to learn about specific course outcomes and requirements.

Each week, you will complete readings that may include videos, multimedia presentations, web-based resources, and articles from professional journals. A reading may be integrated within an activity during the week or provide some key information to assist your learning. In this course, you will also experience online learning activities, which include discussion boards, virtual simulations, group work, and online multimedia presentations.

## Section 4: Assessments and Grading Policy

### Assessments

Each assessment will be assigned a numerical value out of 10 points. Your final grade is calculated as a weighted average of the total number of points (see below for details). Specific due dates will be placed in the lesson modules and in the table on Section 7 and in our electronic classroom.

### Grading Policy

Your cumulative average will be based on the following weighted averages:

Category	Total Points	Percentage Weights
Nine (9) Module Quizzes	90	~20.93%
Fourteen (14) Discussions	140	~32.56%
Seven (7) Hands on Problems	70	~16.28%
Eight (8) SimBio Laboratories	80	~18.61%
Five (5) Exercises: <i>Natural History Lab, Cemetery Survivorship Curves, Population Pyramids, Paramecia Interactions, Vegetation Data Analysis</i>	50	~11.62%
<b>Total:</b>	<b>430</b>	<b>100</b>

The grading scale for students enrolled for credit is:

A+ (98-100%)	A (94 to <98%)	A- (90 to <94%)
B+ (88 to <90%)	B (84 to <88%)	B- (80 to <84%)
	C (70 to <80%) There is no "D" for graduate-level courses at Johns Hopkins University.	
	F (<70%)	

**Late work (any assignment turned in after an assigned due date) will receive zero credit and extra credit is not used in this course.** If you are experiencing extenuating circumstances, you must reach out to me immediately. For additional information, please read page 17 (Section entitled, "Getting Help").

### Assignment Guidelines

#### 1. How should assignments be submitted?

The weekly directions will indicate where assignments will be posted (e.g., in assignment tool within the Lessons folder). If submitting documents to an assignment or forum, please specify the assignment name in the discussion thread and/or the document title. When creating files, include your name and the name of the assignment in the file title. Also, please be sure to only include one period in file names. The period should be between the file name and the extension. For example: YourLastName\_Assignment1.doc, such as SantiagoBlay\_Discussion00.

#### 2. When are assignments due?

Assignment and activity due dates are listed in this syllabus and the weekly checklists. The instructor via an announcement in the online classroom will announce changes. Some larger assignments will be completed over several weeks. In these cases, you will be prompted to complete portions of the assignment each week.

#### 3. When will completed assignments be returned?

Dr. Santiago-Blay will aim to return assignments to you within 5-7 days following the due date, depending on the length of the assignment. You will receive feedback under the My Grades link on the left-hand menu of your course.

#### 4. What is the policy for late assignments?

You are expected to contact your instructor in advance if you think you cannot meet an assignment due date. However, if an assignment is late and prior arrangements have not been made with the instructor, the assignment score will be zero. There are no exceptions.

#### Time Management Expectations: What are the time demands and schedule of the course?

Because this is a graduate-level course the rigor and time commitment are higher than a traditional semester course. It is expected that you look ahead to schedule your time. Plan to complete coursework across several days of the week rather than all in one day.

Some assignments require that you work on them for multiple weeks. Be sure to review the assignment directions at the beginning of the course so that you can plan your time accordingly.

Please seek help before becoming frustrated and spending a significant amount of time to resolve an issue.

## **Section 5: Course Participation and Communication Policy**

### **Participation**

#### **What are the participation requirements?**

You are recommended to log into the online classroom at least three times a week, though a daily check-in is advised. It is your responsibility to read all announcements and discussion postings within your assigned forums. You should revisit the discussion multiple times over the week to monitor and review feedback from your peers. During those Modules where threaded discussions are assigned, I will read and grade the student discussions, but I will not address most posts – this is where a lot of the real learning occurs, and it will be from your peers. In some cases, I might share a related idea, intervene when the discussion goes off-track, or tie student comments together to help deepen student learning. Consequently, I will not directly answer questions in the discussion area unless they are addressed to me. I will check the discussions daily during the week, and occasionally on the weekends.

#### **Network Etiquette (i.e. “Netiquette”)**

In this course, online discussion will be primarily take place in our online discussion board. In all textual online communication, it important to follow proper rules of netiquette.

What is netiquette? Simply stated, it's network etiquette -- that is, the etiquette of cyberspace. And "etiquette" means the social and cultural norms of communicating with others in a proper and respectful way. In other words, netiquette is a set of rules for behaving and interacting properly online.

The Netiquette “Core Rules” linked below are a set of general guidelines for cyberspace behavior. They probably won't cover all situations, but they should give you some basic principles to use in communicating online.

For Netiquette Core Rules visit [The Core Rules of Netiquette](#) web page.

#### **Contacting the Instructor**

The instructor for this course is Dr. Jorge A. Santiago-Blay, [blayj@jhu.edu](mailto:blayj@jhu.edu) .

Feel free to contact me with comments, questions, and concerns. You will receive a response within 24-48 hours.

All email messages will be sent to you via your JHU email account, so you should be in the habit of checking that account every day, or you should ensure that your JHU email account forwards messages to another account of your choice.

Professionalism is expected throughout this course whether in the online classroom or email. Your responses to questions, interaction/communications/emails with classmates or me should be

professional in manner. This includes “netiquette” (electronic etiquette) such as using salutations [not “Hey! Or “Hi Jorge”; instead, Professor (or Dr.) Santiago-Blay, please] when you send an email, signing your emails, and responding to emails in a timely fashion.

## **Section 6: Course Protocols and Getting Help**

### **How will I know about changes to the course?**

Frequently, you will find new announcements posted in the Announcements, which contain information about current course activities that you are working on and any changes to the course. Please check announcements every time that you log into your online course.

### **How should I communicate with others in this course?**

You should communicate often with your classmates and with Professor Blay. Most of communication will take place within the Discussion forums. When you have a question about an assignment or a question about the course, please post your question in the course’s “Ask Your professor” forum.

### **Are there any requirements for sending e-mail messages?**

When you send an e-mail message to the instructor or to another participant in the course, please observe the following guidelines:

1. Include the title of the course in the subject field (e.g., *JHU Principles and Methods of Ecology*).
2. Keep messages concise, and check spelling and grammar.
3. Send longer messages as attachments.
4. Sign your full name (the sender’s email is not always obvious).

## Section 7: Schedule, Course Topics, and Activities

### Tentative Course Schedule

**Important Note:** Activity and assignment details will be explained in detail within each week's corresponding learning module.

<p>Dates (Except for the first and last week, always Monday to Sunday)</p> <p>Module: Topics</p>	<p>Readings from Textbook and Other Available Materials</p> <p><i>Journal Readings Available in our electronic classroom</i></p>	<p>Assessments and Due Dates</p>
<p>May 30 – June 03</p> <p>Module 1: Introduction – The Physical Environment</p>	<p>Textbook: Chapters 1, 2 and 3 and other available materials</p> <p>Journal articles (available in the eReserves tab in our eclassroom):</p> <p>Barnosky et al. 2012, Burgess 2014, Dirzo et al. 2014, Kingsland 2004, Lawton 1999,</p>	<p><b>All homework for this week is due no later than 23:59 Maryland time on June 03, 2018.</b></p> <p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Discussion 00: Introduce yourself and answer the questions (below). 1) Why are you taking this course? 2) Why is ecology important today? 3) Briefly discuss three major developments in ecology, say in the last 30 years. 4) Briefly discuss three major unsolved questions/problems in ecology?</p> <p><i>Deliverables:</i> One initial post, and three (3) meaningful replies to classmates (OK to reply to me especially if nobody else has replied by the time you are prepared to reply). Typing your replies in Blackboard is OK. <b>Due on: June 03, 2018.</b></p> <p><i>To do:</i> Module 1. Quiz on Chapters 1, 2, and 3. <i>Deliverables:</i> Answers submitted through the online classroom. <b>Due on: June 03, 2018.</b></p> <p><i>To do:</i> Hands-on Problem 1.1. To examine weather patterns and mosquito-borne diseases in human populations based on the paper by Chase and Knight (2013): <a href="https://pages.wustl.edu/files/pages/imce/knightlab/chaseknightecologyletters.pdf">https://pages.wustl.edu/files/pages/imce/knightlab/chaseknightecologyletters.pdf</a> <i>Deliverables:</i> Answers submitted through the online classroom in Word (so that I may include comments easily). <b>Due on: June 03, 2018.</b></p>

	<p>Venter et al. 2016</p>	<p><i>To do:</i> Discussion 01 on Module 1. Response to journal readings. Read Venter et al. 2016 introducing ecology and some of the major problems ecosystems face.</p> <p><i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or more classmates and/or the instructor. <b>Due on: June 03, 2018.</b></p> <p><i>To do:</i> Hands-on: Problem 3.1. <i>Learning Goal:</i> To explore biome boundaries and climate change. Are tree-lines advancing up the mountains or retreating?</p> <p><i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: June 03, 2018.</b></p> <p><i>To do:</i> Begin planning Natural History Laboratory (located in Module 2). The scientific method begins with observations about the natural world, its patterns and processes. This assignment will help you begin thinking of testable questions to explain natural observations.</p> <p><i>Deliverables (due on Week 2):</i> A presentation using Photoshop or Prezi with image documentation and a hypothesis. <b>Due on: June 03, 2018.</b></p>
<p>June 04 – June 10</p> <p>Module 2: Dealing with Environmental Variation</p>	<p>Chapters 4 and 5 and other available materials</p> <p>Journal articles:</p> <p>Duffy and Chown 2016</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Natural History Laboratory. The scientific method begins with observations about the natural world, its patterns and processes. This assignment will help you begin thinking of testable questions to explain natural observations.</p> <p><i>Deliverables:</i> A presentation using Photoshop, or Prezi, or VoiceThread with photo documentation and a hypothesis. <b>Due on: Thursday, June 07, 2018.</b></p> <p><i>To do:</i> Module 2. Quiz on Chapters 4 and 5</p> <p><i>Deliverables:</i> Answers submitted through the online classroom. <b>Due on: Thursday, June 07, 2018.</b></p> <p><i>To do:</i> Niche Wars – SimBio. Examine hyperspace partitioning, but the main learning goal is to introduce the SimBio interface.</p> <p><i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on: Sunday, June 10, 2018.</b></p> <p><i>To do:</i> Hands-on Problem 5.1.</p> <p><i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Sunday, June 10, 2018.</b></p> <p><i>To do:</i> Explore comparisons of C3, C4, and CAM photosynthetic pathways.</p>

		<p>Read Photosynthesis and Photorespiration as well as C3, C4, and CAM (both located inside Resources and Readings)</p> <p><i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Sunday, June 10, 2018.</b></p> <p><i>To do:</i> Discussion 02 on Darwin and the Galapagos <a href="https://www.youtube.com/watch?v=kNPbtej1Hk">https://www.youtube.com/watch?v=kNPbtej1Hk</a></p> <p><i>Deliverables:</i> Post comments based on the video and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, June 10, 2018.</b></p> <p>Are you in the mood for a classic? How about one of the (allegedly) most cited papers in biology? Here is an oldie: G. Evelyn Hutchinson's <i>Homage to Santa Rosalia</i> or why there are so many kinds of animals. <a href="https://www.mtholyoke.edu/courses/srachoot/ecevo/HomageToSantaRosalia.pdf">https://www.mtholyoke.edu/courses/srachoot/ecevo/HomageToSantaRosalia.pdf</a></p>
<p>June 11 – June 17</p> <p>Module 3: Evolutionary Ecology</p>	<p>Chapters 6 and 7 and other available materials</p> <p>Journal articles:</p> <p>Grant and Grant, 2008a, 2008b, McArthur 1958, Saccheri et al. 1998</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Module 3. Quiz on Chapters 6, 7 and Darwin's "Finches" readings <i>Deliverables:</i> Answers submitted through the online classroom. <b>Due on: Tuesday, June 12, 2018.</b></p> <p><i>To do:</i> Discussion 03 on How and why species multiply: The case of the (Rosemary &amp; Peter) Grant's and Darwin's Finches <i>Deliverables:</i> Post comments based on article impressions, react to other students' comments, and respond to ideas shared by you or by others in the course. <b>Due on: Thursday, June 14, 2018.</b></p> <p><i>To do:</i> Hands-on Problem 6.1. Learning Goal: To explore how both natural selection and genetic drift can lead to evolution by altering the frequency of alleles in populations. Inbreeding and extinction in a butterfly metapopulation <i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Sunday, June 17, 2018.</b></p>
<p>June 18 – June 24</p> <p>Module 4: Individuals and Populations</p>	<p>Chapters 8 and 9 and other available materials</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> SimBio. Understanding Population Growth Models. <i>Learning Goal:</i> To explore basic population biology concepts including exponential and logistic growth and carrying capacity. <i>Deliverables:</i> Answers submitted through the SimBio interface.</p>

	<p>Journal articles:</p> <p>Massol et al. 2016</p>	<p><b>Due on: Tuesday, June 19, 2018.</b></p> <p><i>To do:</i> Hands-On Problem 9.2.</p> <p><i>Deliverables:</i> Population Pyramids: Word file posted in Blackboard. <b>Due on: Sunday, June 24, 2018.</b></p> <p><i>To do:</i> Cemetery Survivorship Curves. Learning Goal: To use spreadsheets to explore Type I, II and III distributions using real-life data.</p> <p><i>Deliverables:</i> Answers submitted through the online classroom in.xls and Word format. <b>Due on: Sunday, June 24, 2018.</b></p> <p>Discussion 04 on Module 4 <i>Journal Readings</i>. Post comments based on article (<i>Survivorship Curves</i>) and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, June 24, 2018.</b></p>
<p>June 25 – July 01</p> <p>Module 5: Population Dynamics</p>	<p>Chapters 10-11 and other available materials</p> <p>Journal articles:</p> <p>Banks-Leite et al. 2014, Barnowski et al. 2011, Bionanno 2016, Cardinale et al. 2012, Hoegh-Guldberg and Bruno 2010, Prevani 2013</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Module 5 Quiz. <b>Due on: Tuesday, June 26, 2018.</b></p> <p><i>To do:</i> Discussion 05 on Module 5 <i>Learning Goal:</i> To discuss the implications of loss of biodiversity and its impacts on humanity.</p> <p><i>Deliverables:</i> Post comments based on resources and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Thursday, June 28, 2018.</b></p> <p><i>To do:</i> Discussion 06 on Societal Implications of Life Table Analyses</p> <p><i>Deliverables:</i> Post comments based on interpretation of the dataset and what you have learned about population dynamics. Respond to ideas shared by you or by others in the course. <b>Due on: Thursday, June 28, 2018.</b></p> <p><i>To do:</i> Hands-on Problem 11.1. Learning Goal: To explore population overshoots and carrying capacity.</p> <p><i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Sunday, July 01, 2018.</b></p> <p><i>To do:</i> Isle Royale – SimBio. <i>Learning Goal:</i> To explore basic population biology concepts including exponential and logistic growth and carrying capacity.</p> <p><i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on: Sunday, July 01, 2018.</b></p>

<p>July 02 – July 08</p> <p>Module 6: Interactions I</p>	<p>Chapters 12 and 13 and other available materials</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Module 6. Quiz on Chapters 12-13  <i>Deliverables:</i> Answers submitted through the online classroom.  <b>Due on: Tuesday, July 03, 2018.</b></p> <p><i>To do:</i> Vegetation Data Analysis  <i>To do:</i> Use spreadsheets to perform t-test evaluation of hypotheses.  <i>Deliverables:</i> Answers submitted through the online classroom in.xls and Word format. <b>Due on: Thursday, July 05, 2018.</b></p> <p>Barnacle Zone – SimBio. <i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on: Thursday, July 08, 2018.</b></p>
<p>July 09 – July 15</p> <p>Module 7: Interactions II</p>	<p>Chapters 14 and 15 and other available materials</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Module 7. Quiz on Chapters 14-15.  <i>Deliverables:</i> Answers submitted through the online classroom.  <b>Due on: Tuesday, July 10, 2018.</b></p> <p><i>To do:</i> <i>Paramecia</i> Interactions: a look at graphing of niche partitioning.  Learning Goal: To garner an intuitive sense of the concept of niche.  <i>Deliverables:</i> Answers submitted through the online classroom in.xls and Word format. <b>Due on: Sunday, July 15, 2018.</b></p> <p>Top Down Control – SimBio. Learning Goal: To appreciate the complexity of biotic interactions in nature: R2 and Complex interactions. <i>Deliverables:</i> Answers submitted through the SimBio interface.  <b>Due on: Sunday, July 15, 2018.</b></p> <p><i>To do:</i> Discussion 07 on Module 7 <i>Journal Readings</i>  Learning Goal: Discuss the impacts of exotic species invasions. What is the way forward?  <i>Deliverables:</i> Post comments based on article impressions, react to other students' comments, and respond to ideas shared by you or by others in the course. <b>Due on: Sunday, July 15, 2018.</b></p>
<p>July 16 – July 22</p>	<p>Chapter 16 and other</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p>

Module 8: Communities	available materials	Statistical Primer Lab. Learning Goal: To compare biological communities. <i>Deliverables:</i> Written Summary of Results and Interpretation. Answers submitted through the online classroom? <b>Due on: Sunday, July 22, 2018.</b>
July 23 – July 29  Module 9: Biogeography and Vegetation Dynamics	Chapters 17 and 18 and other available materials  Journal articles:  Hobbs et al. 2016, Seebens et al. 2016	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Hands-on Problem 18.1. Learning Goal: To explore patterns of species diversity. Are there General Laws in Ecology? <i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Thursday, July 26, 2018.</b></p> <p><i>To do:</i> Intermediate Disturbance Hypothesis (IDH) – SimBio. <i>Learning Goal:</i> To examine a successional sequence with and without fire disturbance. <i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on: Sunday, July 29, 2018.</b></p> <p><i>To do:</i> Discussion 09 on Module 9 <i>Journal Readings</i>. <i>Learning Goal:</i> To critically evaluate an article proposing possible laws in ecology. <i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, July 29, 2018.</b></p>
July 30 – August 5  Module 10: Biodiversity	Chapters 19 and 20 and other available materials  Journal articles:  Peel et al. 2017	<p><i>To do:</i> Read available materials and watch the video contents of this module.</p> <p><i>To do:</i> Discussion 10 on 100 years of animal extinction. Learning Goal: To produce a pictorial representation of recent extinctions. Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. <i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, August 5, 2018.</b></p> <p><i>To do:</i> Keystone Predator – SimBio. Learning Goal: To recreate the famous experiments of Paine and colleagues in the Pacific Northwest with the sea star <i>Pisaster</i>. <i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on Sunday, August 5, 2018.</b></p>

<p>August 6 – August 12</p> <p>Module 11</p> <p>Energy Flow in Ecosystems</p>	<p>Chapters 21 and 22 and other available materials</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> Modules 11-12. Quiz on Chapters 20-22. <i>Deliverables:</i> Answers submitted through the online classroom. <b>Due on: Thursday, August 12, 2018.</b></p> <p><i>To do:</i> Hands-on Problems 21.1 and 21.2. Explore data dealing with energy flow and trophic structure. <i>Deliverables:</i> Answers submitted through the online classroom in Word format. <b>Due on: Thursday, August 12, 2018.</b></p>
<p>August 13 – August 19</p> <p>Modules 12 and 13:</p> <p>Conservation Biology I; Conservation Biology II; Species and Global Change</p>	<p>Chapters 23 and 24 and other available materials</p> <p>Journal articles:</p> <p>Cook and Sgrò 2017, Seddon et al. 2014</p>	<p><i>To do:</i> Read available materials and watch the video contents, if any, of this module.</p> <p><i>To do:</i> <i>Discussion 12 on Module 12 Journal Readings.</i> Read an article discussing the impacts of climate change to marine ecosystems. <i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, August 19, 2018.</b></p> <p><i>To do:</i> <i>Discussion 13 on Module 13 Journal Readings.</i> Read an article that revisits concepts from Week 1 – Reversing defaunation: Restoring species in a changing world, the Anthropocene, and the human impact on biodiversity <i>the 6<sup>th</sup> and 7<sup>th</sup> Mass Extinction.</i> Ecology from the Air – Ted Talks. The Impact of Climate Change on the World’s Marine Ecosystems <i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor. <b>Due on: Sunday, August 19, 2018.</b></p> <p><i>To do:</i> <i>Patchy Prairies – SimBio.</i> You will experiment with habitat restoration schemes that will maximize survivorship of butterflies, given pre-existing patches of prairie. <i>Deliverables:</i> Answers submitted through the SimBio interface. <b>Due on: Sunday, August 19, 2018.</b></p>
<p>August 20 – August 22</p> <p>Module 14: Species and</p>	<p>Chapter 25 and other available materials</p>	<p><b>You are about to complete this course! ☺</b></p> <p><b>All homework for this week is due on August 22, 2018.</b></p> <p><i>To do:</i> Read available materials and watch the video contents, if any, of this</p>

Global Change	Journal Readings:  Chave 2013, Pace et al. 2015, Potapov et al. 2017, Prerson et al. 2016, Simberloff et al. 2013, Xie et al. 2015	module.  Complete Quiz on Module 14. <b>Due on Wednesday, August 22, 2018.</b>  <i>Discussion 14:</i> Post to Blackboard. <b>Due on Wednesday, August 22, 2018.</b>  <i>To do:</i> Based on the readings of the assigned articles, revisit your answers to the questions originally posted during the first Discussion of this course. Then, discuss these questions again including how (if in anything) you have changed after taking this course. 1) Why is ecology important today? 2) Name three major developments and three unsolved major questions in ecology, say in the last 10 years? 3) What three (3), or more, features of this course you would improve? Thank you!  <i>Deliverables:</i> Post comments based on article and respond to ideas shared by you or by others in the course by three or more classmates and/or the instructor.
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## Section 8: University Policies

### General

This course adheres to all University policies described in the academic catalog. Please pay close attention to the following policies:

### Students with Disabilities

Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact the coordinator listed on the [Disability Accommodations](#) page. Further information and a link to the Student Request for Accommodation form can also be found on the [Disability Accommodations](#) page.

### Ethics & Plagiarism: JHU Ethics Statement

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. Read and adhere to JHU's [Notice on Plagiarism](#).

### Dropping the Course

You are responsible for understanding the university's policies and procedures regarding withdrawing from courses found in the current catalog. You should be aware of the current due dates according to the [Academic Calendar](#).

### **Getting Help**

You have a variety of methods to get help. Please consult the help listed in the "Blackboard Help" link in the online classroom for important information. If you encounter technical difficulty in completing or submitting any online assessment, please immediately contact the designated help desk listed on the [AAP online support page](#). Also, contact your instructor at the email address listed atop this syllabus.

### **Copyright Policy**

All course materials are the property of JHU and are to be used for the student's individual academic purpose only. Any dissemination, copying, reproducing, modification, displaying, or transmitting of any course material content for any other purpose is prohibited, will be considered misconduct under the [JHU Copyright Compliance Policy](#), and may be cause for disciplinary action. In addition, encouraging academic dishonesty or cheating by distributing information about course materials or assignments which would give an unfair advantage to others may violate AAP's [Code of Conduct](#) and the University's [Student Conduct Code](#). Specifically, recordings, course materials, and lecture notes may not be exchanged or distributed for commercial purposes, for compensation, or for any purpose other than use by students enrolled in the class. Other distributions of such materials by students may be deemed to violate the above University policies and be subject to disciplinary action.

### **Code of Conduct**

To better support all students, the Johns Hopkins University non-academic [Student Conduct Code](#) has been integrated and updated to include all divisions of the University. In addition, it is important to note that all AAP students are still accountable for the [Code of Conduct for Advanced Academic Programs](#).

### **Title IX: Confidentiality and Mandatory Reporting**

As an instructor, one of my responsibilities is to help create a safe and inclusive learning environment on our campus. I also have mandatory reporting responsibilities related to my role as a Responsible Employee under the Sexual Misconduct Policy & Procedures (which prohibits sexual harassment, sexual assault, relationship violence and stalking), as well as the General Anti-Harassment Policy (which prohibits all types of protected status-based discrimination and harassment). It is my Learning Goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep information you share private to the greatest extent possible. However, I am required to share information that I learn of regarding sexual misconduct, as well as protected status-based harassment and discrimination, with the Office of Institutional Equity (OIE). For a list of individuals/offices who can speak with you confidentially, please see Appendix B of the [JHU Sexual Misconduct Policies and Laws](#).

For more information on both policies mentioned above, please see: [JHU Relevant Policies, Codes, Statements and Principles](#). Please also note that certain faculty and other University community members also have a duty as a designated Campus Safety Authority under the Clery Act to notify campus security of certain crimes, as well as a duty under State law and University policy to report suspected child abuse and/or neglect.