**Biological Sciences 2100: Island Biogeography of New Zealand**

**Syllabus – last revised November 26, 18**

Pacific Study Abroad Program, Spring 2019

(3 credit hours)

**Instructor:**

Dr. Chrissy Spencer, chrissy.spencer@biology.gatech.edu, office hours location and time TBD

**Class Time and Location:** TBA

**Course Description:**

This course introduces students to the basic concepts of biogeography (factors determining the distribution of species) as applied in the special case of islands. The two oceanic islands comprising New Zealand provide relevant examples of the interaction of geology (plate tectonics, island formation, geological history, and the influence of land forms) and biology (size of islands, distance from mainland, adaptive radiation and island endemism). The first half of the Biological Sciences 2100 course focuses on the geological setting of New Zealand, which provides excellent examples of the interaction between plate tectonics and the geologic and geographic evolution of the North and South Islands, and the influence of landscapes, topography and geology on island climate and biota. The second half on the biological processes of colonization, adaptive radiation and extinction. The varied land forms of New Zealand provide an excellent laboratory for observing the island forming process, which is still active. National parks have preserved the natural plant and animal communities, found nowhere else on the planet, and which the students will have the opportunity to observe first-hand.

This course includes field trips to geological sites and natural preserves. All students should be able to negotiate difficult terrain, as well as be prepared to deal with inclement weather.

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

1. Know, recognize, and explain how and how quickly evolution by natural selection shapes species traits to their environments
2. identify and explain basic concepts of biogeography as applied to islands
3. explore the potential impacts of IUCN species status using New Zealand examples.
4. Name and recognize geologic features of New Zealand how they affect species distributions
5. Consider, document, and reflect on the geology and biology of New Zealand.

**Required Resources:**

* Rat Island: Predators in Paradise and the World's Greatest Wildlife Rescue, William Stolzenburg
* Small Bound journal or notebook for field notes (before first field trip)
* Detailed hand-outs and field exercises (provided in class)

**Optional Resources:**

* G. Gibbs (2016) Ghosts of Gondwana: The history of life in New Zealand, 2ed.
* G. Stevens, M. McClone and B. McCulloch (1995) “Prehistoric New Zealand”
* N. Mortimer and H. Campbell (2014) “Zealandia – Our Continent Revealed”

**Grading:**

Exams: 50%

Tests: 15%

In-Class Activities & Participation: 10%

Field journal: 15%

Charged Magazine Article: 10%

We will assign final letter grades using the following scale:

A: ≥ 90.0% B: ≥ 80.0% and < 90.0% C: ≥ 70.0% and < 80.0% D: ≥ 60.0% and < 70.0% F: < 60.0%

**Tests and Final Exam**: *Short* tests held *weekly on Thursdays at the beginning of class.* These will be comprised of a mix of multiple choice, diagram/graph reading, and short answer questions. Test questions will be focused on recent material but as content knowledge deepens, some degree of cumulative recall is expected. The final exam will be a cumulative exam. If you miss a test for any reason, you will receive a grade of 0 (zero) on that test unless you petition for an excused absence within 24 h of the start of the missed test, and we approve your petition. Petitions must be submitted in person. Excused test grades will be replaced by the weighted average of your other tests in the course. Note that because the Pacific Program does not allow for class absences, there are very few reasons that would be accepted to miss a test.

**In-Class Activities & Participation:** Biological and geological concepts are easier to learn and remember if you have the opportunity to apply them, practicing the skills you’ll need to do well on tests and exams. In-class activities are team-based exercises to practice application of concepts from the course to relevant island examples. Many activities will have a graded portion to hand-in before you leave class. Attendance of class and field exercises is mandatory. Any unexcused absence incurs a 5% reduction in final course grade.

**Field Trips and Journal:** We have three scheduled trips and one self-guided museum trip. Students with excused absences from the field trips will be assigned a replacement assignment of equivalent work and similar content. In addition, each of you will have 4 long weekends to explore the area, either locally or further afield. In this course, you’ll keep a field journal, which should include an entry from each of course-related field trip plus two additional freeform, NZ-based entries on your own:

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| **Field Trip** | **Field Trip Date** | **Journal Entry due on Canvas** |
| I. Orokonui Ecosanctuary (Self-guided) | 6-Jan (Sun) | 14-Jan |
| II. Otago Museum (Self-guided) | first week, on your own | 21-Jan |
| III. Lake Tekapo area Hike (part of 4-day field trip) | 17-Jan to 20-Jan | 28-Jan |
| IV. Taiaroa Head (Afternoon field trip) | 28-Jan | 4-Feb |
| V. On your own – Geology focus | anytime, on your own | 11-Feb |
| VI. On your own – Biology focus | anytime, on your own | 18-Feb |

A Field Journal Guidelines and Rubric is available on Canvas in the Field Journal module. Please download and consult this before completing your first entry.

New Zealand is an amazing place to begin field journaling. A strong field journal includes your field observations, sketches and diagrams, interpretation, and reflections about the natural world in New Zealand. Here are two useful links to learn how to keep a field journal:

* <https://yellowstonenaturalist.com/field-journal/>
* <http://cemarin.ucanr.edu/files/220523.pdf>
* <https://pages.wustl.edu/files/pages/imce/mnh/grinnell-journaling.pdf>

While I will not collect your field journal, I can speak from experience that it will be an amazing way to remember your trip and will also be invaluable to write up the graded journal entries. Journal entries synthesize what you saw in the field, what you learned in class or from additional research, and your reflections on those. It includes an Introduction, a summary of what you saw of relevance, how it relates to class, and your reflections on why this matters. If you reference books or articles, give credit using the (Author Year) in-text referencing system and then list the citations at the end using APA format. Looking for suggestions on what to write? Consider a compare and contrast with North American natural history, how humans interact and impact the natural world (conservation and preservation), or relate an idea from lecture or course readings to New Zealand biogeography. Again, consult with the instructor if you are unsure how to tackle field journaling and journal entries.

Please write each formal journal entry by the specific due dates listed above, usually within one week of the field trip. Entries will be submitted electronically on Canvas/Assignments to allow you to keep your journal with you as you travel. Electronic submissions should be pdf or image files. You may type and embed images or scan your (highly legible) journal pages directly using your phone or scanners available at Otago University.

**Charged Magazine Article:** New Zealand’s unique geological history has resulted in a remarkable, endemic ecological community with no native large terrestrial mammals. The humans and human-associated animals now present have endangered or extirpated many endemic fauna. Each student will select a specific animal species (or group) native to New Zealand and tasked to write an article for Charged Magazine (<http://chargedmagazine.org/submit/>), relating your species and its current status to real, live people back home in the United States. Your work will be evaluated on the following criteria, modified from the Charged Magazine website:

1. Voice – You are encouraged to write in the first person, reflectively, about your subject. Try to avoid using scientific jargon or formal language. We welcome a variety of writing styles but boring is not one of them.
2. Creative content – Pieces cannot consist of reposted content with commentary. Each submission must include original words, created by you, and may also include other creative work: a sketch, photograph, video, audio recording, poem. You have permission to repurpose ideas and words from your journal entries to create this article, but please note that an exact replica will not meet the requirements of this assignment. Reminder: The GT Honor Code is strict on the subject of plagiarism. All text must be in your own words and ideas, and any quotes from sources must be referenced using standard formats. Extensive quotes are not in character for Charged Magazine, which seeks contributions in the authors own words and ideas.
3. Subject matter –Your submission should include the following factual content at minimum, all supported from the scientific literature and appropriately cited:
   * + scientific name(s) of your organism(s) and taxonomic group, including closest living relatives, if any, and where found
     + vicariance or dispersal evidence and timing for origin or arrival in NZ
     + ecological niche and basic life history
     + the endangered or extinct status, why or how and what steps are being taken to prevent extinction (if it is still found in NZ)
     + a creative connection between the species and your readers

A detailed rubric is on Canvas.

A complete draft is due in class on Tuesday 12-Feb. The final article is due on Thursday 21-Feb by midnight (local time) as a pdf file to Canvas/Assignments/Charged Article. This is one week after the end of the NZ term.

**Late Assignments and Extensions:** Assignments submitted after the due date/time will be penalized at the rate of 10% for each 24 hour period. Requests for variances in this policy can be discussed in person with the course instructor.

**Academic Honor Code and Plagiarism:** All students are expected to abide by the Academic Honor Code, which can be viewed online at [www.honor.gatech.edu](http://www.honor.gatech.edu). We take the Honor Code very seriously and are required to report any potential violations. Some specific examples of Honor Code violations include copying during exams, completing work while logged in as another student, and plagiarism. Everything that you write or create in this course must be original content created by you, not copied from another source. Copying the words or even the ideas of someone else is plagiarism. Any suspected plagiarism will be submitted to the Office of Student Integrity for evaluation.

**Learning Accommodations:** We will make classroom and field work accommodations for students with disabilities. These accommodations must be arranged in advance and in accordance with the [Office of Disability Services](http://disabilityservices.gatech.edu).

**Schedule:** Lectures held Monday-Thursday, times TBA, schedule subject to revision.

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| **Date** | **Lecture Topics** | **Activities/Field Trips** |
| 8-Jan | L01: Course Intro plus Earth structure and major rock types – rock cycle. | Self guided visit to Te Papa Museum any day this week |
| 9-Jan | L02: Minerals, magmas and volcanoes |  |
| 10-Jan | L03: Folds, faults, and earthquakes |  |
| 11-Jan | L04: Global plate tectonics - intro | Test 1 (10 minutes) |
| 15-Jan | *Field trip – lecture does not meet* | Half-day Field Trip (12–6 pm):  Taputeranga Marine Reserve  *Write up your Te Papa Journal Entry (A)* |
| 16-Jan | L05: Global plate tectonics | *Write up your Taputeranga Journal Entry (B)* |
| 17-Jan | L06: New Zealand plate tectonics and Taupo Volcanic Zone | Test 2 (10 minutes) |
| 18-Jan | *Field trip–lecture does not meet* | Four day Field Trip (Thurs-Sun):  Lake Taupo & Tongariro National Park |
| 22-Jan | L07: Zealandia – was NZ submerged – impact on Flora and Fauna | *Write up your Taupo & Tongariro Journal Entry (C).*  ***Journals Entries A, B, C due to at dinner*** |
| 23-Jan | L08: Review of exam format, Formation of atolls & island chains. |  |
| 24-Jan | Review Session for Exam 1 |  |
| 25-Jan | **Exam 1: Covers lectures L01-08 & accompanying field trips** | **Exam** (90 minutes, closed book) |
| 29-Jan | L09: Introduction to Biogeography | Activity – Archipelagoes |
| 30-Jan | L10: Island Biogeography Theory | Activity – Island Biogeography |
| 31-Jan | L11: Evolution by Natural Selection | Activity - Galapagos Finches |
| 1-Feb | L12: Human Impacts - Invasive Species | Test 3 (10 minutes)  Activity - New Zealand Rabbits |
| 5-Feb | *Field trip–lecture does not meet* | Half-day Field Trip (1:45-5:00 PM):  Zealandia Kaori Sanctuary |
| 6-Feb | L13: Intro to Population Ecology | Activity – TBA  ***Zealandia Kaori Journal Entry (D) due on Canvas by midnight*** |
| 7-Feb | L14: Endemic New Zealand species | Activity – Tree Thinking |
| 8-Feb | L15: Historical Biogeography of NZ | Test 4 (10 minutes) |
| 12-Feb | L16: Biodiversity 1 | Activity – TBA  ***On your own Journal Entries (E & F) due on Canvas by midnight*** |
| 13-Feb | L17: Biodiversity 2 | ***Charged Article complete draft due****. Bring TWO physical copies to class for peer review and instructor comment.* |
| 14-Feb | L18: Conservation Biology | Activity – Corridors |
| 15-Feb | Review Session for Exam 2 |  |
| 16 or 17-Feb | **Exam 2: Covers lectures L09-18 & accompanying field trips** | **Exam** (90 minutes, closed book) |