

Biology 2100: Island Biogeography of New Zealand
Pacific Study Abroad Program, Spring 2015
(3 credit hours)

Instructors: Dr. David Garton, Georgia Tech
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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 course focuses on the geological setting of New Zealand, and 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.

Textbook: *The Song of the Dodo: Island Biogeography in an Age of Extinctions*, David Quammen

This course uses detailed hand-outs and field exercises prepared specifically for this course by the participating faculty.

Grading statement:

Two midterm exams (closed notes):	25% each
Field journal:	20% (will be checked during the term!)
Research Paper:	15% (topic to be assigned)
Mid-course quizzes:	15% (7.5% each)

Both exams will be administered at Victoria University. The field journals, which include data analysis and interpretation to answer specific questions, will be due two weeks after the end of first term and returned before the class departs home to the US.

Reminder: Attendance of class and field exercises is **mandatory**. Any unexcused absence incurs a 5% reduction in final course average.

Lectures: Monday-Thursday, time tba

1. Jan 07: Introduction; aims and overview of course; introduction to biogeography and geology – **JC**
2. Jan 08: Geological time and geological systems - **JC**

3. Jan 09: Structure of the Earth; changing continental configurations through time; plate tectonics of New Zealand; [outline of geology of first weekend trips](#) – **JC**

4. Jan 12: [Recap of weekend trips](#). Volcanoes and volcanicity; volcanic hazard & effects on biota - **JC**

5. Jan 13: Oceanic islands wrt biogeography and to Heron island; significance to biogeography of NZ – **JC**

6. Jan 14: Stratigraphy, dating and geologic time: sedimentary rocks, principles of stratigraphy, development of geological time scale, biostratigraphy, relative and absolute dating – **JC**

7. Jan 15: **Mid-course quiz**

Stratigraphy, dating and geologic time: continued; [outline of geology of rest of weekend trips](#) – **JC**

8. Jan 19: [Recap of weekend trips](#). Stratigraphy, dating and geologic time: continued – **JC**

9. Jan 20: Taphonomy and the New Zealand fossil record: types of fossilization, limiting effect on our interpretations (mainly hands-on session) – **JC**

10. Jan 21: Preparation for Taupo excursion - **JC**

Taupo excursion: January 23- 26

11. Jan 26: [Discussion of Taupo trip](#). History of life through time: origin of life, main global patterns of life through time, atmospheres, carbonates and evolution; biodiversity and extinction through time. [Discussion of South Coast Excursion](#) - **JC**

12. Jan 27: Geological history of New Zealand & its life: Gondwana & earlier, post-Gondwana, evolution & patterns of ancient life in NZ; the submergence controversy - **JC**

13. Jan 28: Global atmosphere and climate change: evolution of the Earth's atmosphere, effects on biological evolution, climate changes through geologic time, Quaternary climate change. [Review lecture about 45 minutes](#) – **JC**

14. Jan 28: **Mid-course examination (evening at Weir House)**

- 15. Feb 2: Afternoon field trip to Zealandia/Karori Sanctuary-DG
- 15. Feb 3: Introduction to Island Biogeography Theory-DG
- 16. Feb 4: How do species form and why are islands “hot spots” for speciation?-DG
- 17. Feb 5: Principles of evolution: Natural Selection; quiz-DG
- 18. Feb 9: Principles of evolution: Biodiversity and Biogeography-DG
- 19. Feb. 10: Island Biogeography and Conservation in New Zealand; quiz-DG
- 20. Feb. 11: Biological Conservation: Lessons from *Song of the Dodo?*-DG
- 21. Feb 12: Unique plants and animals of New Zealand-DG
- 22. Feb 13 or 14: Final Exam (covers DG lectures)
- Feb 15: Depart for Melbourne