

# ECOLOGICAL GENOMICS (GRADUATE CERTIFICATE)

## Description

The Graduate Certificate in Ecological Genomics at the University of New Hampshire is an interdisciplinary program to provide graduate level training that spans molecular to ecological scales. Students will be trained to study genome evolution in an ecological context using a systems-based approach, whereby genomic evolution is considered within an integrated system resulting from mechanisms operating across molecular, cellular, organismal, and ecological scales. Students within the program have the opportunity to build their five course certificate from a variety of course options from four broad disciplinary areas and one required seminar course. The flexibility of the program enables students with interdisciplinary interests to complement their current degrees in the life sciences broadly, and it is ideal for students with career interests in both the applied or basic sciences. This unique program also has an inter-institutional option, which affords the possibility for interested students to fulfill one or more of the requirements through offerings at the University of Maine.

**Admission Requirement:** Students should be enrolled in any graduate degree program in the College of Life Sciences and Agriculture. Otherwise, students must hold a life-science related baccalaureate degree from an accredited college or university, with a minimum GPA of 2.5 (or its equivalent) and achieve a minimum TOEFL score of 80, for those without a degree from an English-speaking institution. Courses taken at other institutions are not eligible to be transferred into the program.

## Requirements

### Requirements

This program of study requires five courses and a total of at least **13 credits**: one course selected from offerings in each of four disciplinary areas and a fifth required seminar course. All courses can be completed at the University of New Hampshire, as outlined below. Through a cooperative agreement between the Universities of New Hampshire and Maine, some courses at University of Maine may fulfill one or more of the requirements for this program. In these cases, the University of New Hampshire student will enroll in an appropriate University of New Hampshire special topics course (e.g. NR 995 Investigations) and the content will be delivered remotely via a University of Maine course. Only select courses may be offered in this cross-institutional format. Contact the coordinator of the certificate program to get an up-to-date list of approved University of Maine courses.

Course Offerings and Requirements:

| Code                         | Title                           | Credits |
|------------------------------|---------------------------------|---------|
| <b>Genetics and Genomics</b> |                                 |         |
| Select one of the following: |                                 |         |
| GEN 805                      | Population Genetics             | 3       |
| GEN 815                      | Molecular Evolution             | 4       |
| GEN 821                      | Comparative Genomics            | 4       |
| GEN 872                      | Evolutionary Genetics of Plants | 4       |
| NR 908                       | Landscape Genetics              | 3       |

| Code  | Title  | Credits |
|---|--|---------|
| <b>Cell Biology, Biochemistry, and Physiology</b> |  |         |
| Select one of the following:                      |  |         |
| BCHM 802  | Endocrinology                                      | 4       |
| BCHM 850  | Physical Biochemistry                              | 3       |
| BCHM 851  | Principles of Biochemistry I (and)                 | 4       |
| BCHM 852  | Principles of Biochemistry II                      | 4       |
| BCHM 863  | Biochemistry of Cancer                             | 4       |
| BCHM 894  | Protein Structure and Function                     | 4       |
| BIOL 801  | Plant Physiology                                   | 4       |
| BIOL 805  | Molecular and Cellular Neurobiology                | 4       |
| GEN 817   | Molecular Microbiology                             | 5       |
| ZOOL 877  | Neuroethology: The Neural Basis of Animal Behavior | 4       |

| Code                         | Title                           | Credits |
|------------------------------|---------------------------------|---------|
| <b>Ecology and Evolution</b> |                                 |         |
| Select one of the following: |                                 |         |
| BIOL 804                     | Plant-Microbe Interactions      | 3       |
| BIOL 820                     | Plant-Animal Interactions       | 4       |
| GEN 813                      | Microbial Ecology and Evolution | 4       |
| NR 834                       | Tropical Ecology                | 4       |
| NR 965                       | Community Ecology               | 4       |
| ZOOL 833                     | Behavioral Ecology              | 4       |

| Code  | Title                          | Credits |
|---|--------------------------------|---------|
| <b>Bioinformatics and Computational Biology</b> |                                |         |
| Select one of the following:                    |                                |         |
| GEN 811   | Genomics and Bioinformatics    | 0 or 4  |
| GEN 812   | Programming for Bioinformatics | 5       |
| MCBS 913  | Applied Bioinformatics         | 3       |