Field Study in Natural Sciences
and
Methods in Teaching Natural Sciences to Children

3 Graduate Credits per Course

WhaleNet, Boston, Mass.
Syllabus

Choose from two 1-week courses:

Week One - Field Study in Natural Sciences (content focus)
and
Week Two - Methods in Teaching Natural Sciences to Children (educational methods focus)

Activities, content, and materials are consistent with elements of the National and Massachusetts Standards for Math and Science. Participation in the course is open to undergraduates with the approval of the instructor.

When: Monday thru Friday: Aug 5 - Aug 9 and/or Aug 12 - Aug 16, 2002
Course Costs: $225 per Master level credit hour plus $185 materials fee
(Total: $860 + room and board, if needed.)

Endicott College is accredited by the New England Association of Schools and Colleges.

Course Description:

Learn, hands-on, about ecology, life sciences, and physical sciences using the coastal marine ecosystem, marine mammal biology, the organisms that inhabit the coastal environment, and techniques related to marine field research. Food chains, Life and Physical Science, basic oceanographic concepts, animal behavior, general research methods, data assimilation and analysis, and technological applications to education will be studied.

Participants will also have the opportunity to learn elements of navigation, bathymetry, and wildlife photography while participating in a long term study in marine mammal research with an established research
organization. **No prior knowledge in marine sciences is needed -- just the desire to learn.**

**Field Study** participating in an established research program, 3 days on board a U.S. Coast Guard approved vessel in Massachusetts Bay. An independent study project is also available, Canada on the Gulf of St. Lawrence with the **Mingan Island Cetacean Study**.

Students will spend Monday through Friday participating in an established research program, 3 days will be aboard a 100 ft. U.S. Coast Guard approved vessel in Massachusetts Bay. An independent study project is also available in Longue Pointe de Mingan, Quebec, Canada on the Gulf of St. Lawrence with the **Mingan Island Cetacean Study**.

Students will:

- complete pre-project readings with an annotated bibliography,
- participate in a 5-day research project, and
- complete an Final Product which relates directly to the focus of the program (Due by Oct. 1).

The Final Product may be one of the following: a teaching unit based on the readings and research experience, a research paper, or an article based upon the experience submitted to a professional publication in its specified format.

Room and board, if needed, is the responsibility of the student and will be a cost in addition to the tuition.

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**For Information and registration materials contact:**

**WhaleNet Office** - 617/879-2256
or email (williams@whale.wheelock.edu)
**Field Study Information (pdf file)**

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or email (williams@whale.wheelock.edu)
**Field Study Information (pdf file)**

or Contact:

Priscilla Sabean
School of Graduate and Professional Studies
Endicott College
376 Hale Street
Beverly, MA 01915
978-232-2199 or 978-232-2044

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**Instructor: J. Michael Williamson (Bio), Associate Professor, Director WhaleNet**

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**Lecture and Research Associates:**

Visiting Lecturers

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**Evaluation:**

a. **Discussion** of final product topic with the Wheelock College instructor Michael Williamson.

b. A minimum required reading assignment with an **annotated bibliography** consisting of 25 points related to the research -- 5 points/book (i.e. general information or interest volume); 1 point/journal article; and 2 points/selected topics of scientific references (i.e. research a specific point of information on behavior, biology, physiology, etc.)
c. Participation in a 5 day session which includes attending the lectures, participating in the daily research, and completion of an individual research project which will enrich your teaching experience. (An independent study with the Mingan Island Cetacean Study is available.)

d. Development of a final product. For example, the final product may be a teaching unit for your respective grade level, an article to submit to a professional journal, or a report on a specific point of interest in the research.

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**Week 1 - Outline: Field Study in Natural Sciences**

**General introduction**

- Water analysis techniques - [Physical Properties of water](#)
- Biological concepts and processes - Food chains
- Marine Environments
- Marine Mammals in the [Gulf of Maine](#)
- Human Interaction and Influences on the Marine Environment
- Other skills include:
  - Navigation methods
  - Data collection methods
  - Photographic techniques
  - Current research methods
  - Intro to Water analysis techniques

**Introduction to telecommunications in data and information assimilation**

- Internet and Research
- Email

**Water analysis techniques**

- Thermoclines, Haloclines, and Pycnoclines, and [Water Dynamics](#)
- Temperature, Salinity and Density

**Biological Concepts and Processes**

- Food Chains - coastal and marine [Productivity and Biotic and Abiotic Factors](#)
- Plankton collection, analysis, and identification
- Adaptations - Basic Anatomy and Physiology of Whales vs. Fish
- Marine Mammals/Whales in the Gulf of Maine
  - Mysticetes and Odontocetes
  - Echolocation, Communication and Sound
  - Respiration
  - Diving Reflex
  - Migration
  - Animal behavior
  - [Social Interaction](#)
  - Characteristics of whale species
  - [Feeding and Reproduction](#)

**Human Interaction and Influences on the Marine Environment**

- [Humpback Whales](#)
- [Right Whales](#)
- Fishing and Whale Watching
- Economic Status of Stellwagen Bank
- Entanglements
Gill nets and harbor porpoise

Methods of **species** and **individual** identification.

- **Baleen whales** - Humpback, Fin, Minke, and Right Whales.
- **Toothed whales** - great whales, dolphins, and porpoises

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**Week 2 - Outline: Methods in Teaching Natural Sciences to Children**

**General introduction**

Classroom and Field Methods of teaching the following concepts to grade K-9 children will be integrated into and emphasized in this session. Hands-on and inquiry related activities will be stressed. Activities, content, and materials are consistent with elements of the National and Massachusetts Standards for Math and Science.

- Water analysis techniques - Physical Properties of water
- Biological concepts and processes - Food chains
- Marine Environments
- Marine Mammals in the Gulf of Maine
- Human Interaction and Influences on the Marine Environment
- Other skills include:
  - Navigation methods
  - Data collection methods
  - Photographic techniques
  - Current research methods
  - Intro to Water analysis techniques

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NOTE: Alternate day trips to the Museum of Comparative Zoology, Harvard University and intertidal studies at local locations may be substituted if the boat trip is cancelled for any reason.