

Course Syllabus

Department: Environmental Conservation and Horticulture

Date: December 19, 2012

I. Course Prefix and Number: BIO 246

Course Name: Limnology

Credit Hours and Contact Hours: 4 credit hours – 5 contact hours

Catalog Description including pre- and co-requisites: An introduction to the scientific study of inland waters, limnology concerns itself with all the factors that affect living populations within those waters. Through lecture and field experiences, the student will become familiar with physical and chemical processes in water, especially those that have a direct effect on biological organisms. Standard methods and highly technical instrumentation will be used on board the college's educational vessel. A survey of life forms and identification skills will be emphasized as well as aquatic community structure and interactions. (Also listed as CON 246.)

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable: Limnology is an elective choice in the AAS Natural Resources Conservation, AS Environmental Studies, AAS Natural Resources Conservation: Law Enforcement, AAS Fish and Wildlife Technology program, and other FLCC degree programs requiring a science elective.

II. Course Student Learning Outcomes:

1. Students will comprehend the historical development of the science of limnology, it's multidisciplinary nature, and the complex issues affecting modern water resource management.
2. Students will demonstrate identification skills for aquatic organisms as well as knowledge of their taxonomic classification.
3. Students will recognize the impact of invasive species on the structure of function of aquatic communities.
4. Students will be able to successfully operate state-of-the-art limnology field equipment including water quality data loggers, Van Dorn samplers, bottom dredges, plankton nets, and fisheries equipment as well as standard laboratory instruments including weighing balances, dissecting microscopes and spectrophotometers.

College Learning Outcomes Addressed by the Course: *(check each College Learning Outcome addressed by the Student Learning Outcomes)*

- | | |
|---|---|
| <input type="checkbox"/> writing | <input type="checkbox"/> computer literacy |
| <input type="checkbox"/> oral communications | <input type="checkbox"/> ethics/values |
| <input type="checkbox"/> reading | <input type="checkbox"/> citizenship |
| <input checked="" type="checkbox"/> mathematics | <input checked="" type="checkbox"/> global concerns |
| <input checked="" type="checkbox"/> critical thinking | <input checked="" type="checkbox"/> information resources |

III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): *For each identified outcome checked, please provide the specific assessment measure.*

List identified College Learning Outcomes(s)	Specific assessment measure(s)
Mathematics	Students will perform statistical analysis of data through use of spreadsheets. Students will convert field data to useful limnological indices with appropriate formulas. Students will create graphs and charts that visually represent their field data.
Critical thinking (problem-solving)	Students will successfully interpret and transform local limnological descriptive data (e.g., water quality profiles, species checklists, pond morphometry statistics) into relevant functional information (e.g., heat budgets, food-web diagrams, pond volume estimates).
Global concerns	Students will demonstrate their knowledge and understanding of limnological processes affecting water resources globally (e.g., cultural eutrophication, harmful algal blooms, toxic pollutants) by successfully completing quizzes, exams and laboratory reports.
Information resources	Students will locate, evaluate and use library/Internet resources for their laboratory assignments and take-home quizzes.

V. Instructional Materials and Methods

Types of Course Materials: The following textbook is required for this course:

Dodson, Stanley. 2005. Introduction to Limnology. McGraw-Hill Publishing. New York, NY. 400 pp.

The following reference book is optional for this course:

Reid, George. 2001. Pond Life: A Guide to Common Plants and Animals of North American Ponds and Lakes. St. Martin's Press, New York, NY. 160 pp.

Methods of Instruction (e.g. Lecture, Lab, Seminar ...): A combination of lectures, labs, seminars and field trips to local lakes, streams, ponds, reservoirs and bogs are used in this course. A four day, resident experience at a local field station immerses students in an intensive water-based educational framework.

V. General Outline of Topics Covered:

Lecture topics:

Introduction to limnology
Characteristics of water
Vertical temperature profiles
Lake mixing events
Vertical oxygen profiles
Underwater light environment
Heat budgets
Water movements
Ripples, waves and seiches
Diversity of aquatic organisms
Prokaryotes, protista, fungi
Rotifers, annelids, branchiopods
Copepods, malacostracans, insects
Mollusks, fishes, and other large animals
Aquatic macrophytes
Introduction to population dynamics
Life history strategies
Ecology of aquatic communities
Community interactions and community structure
Community change and invasive species
Primary and secondary production
Carbon cycle, oxygen cycle
Nutrient dynamics: phosphorus and nitrogen cycles
Sizes and shapes of lakes and streams
Lake and stream origins
Watershed management and applied limnology

Laboratory topics:

Physical limnology of the Finger Lakes
Heat budgets and resistance to mixing
Introduction to plankton
Macrophyte communities in Honeoye Lake
Aquatic invasive species
Introduction to macro-organisms
Residential experience at a local field station
Field collection of stream data on the Honeoye
Outlet and Mill Creek
Field collection of stream data on Eelpot Creek
Food-web models
Primary productivity of lakes and ponds
Limnological statistics
Production of morphometric maps
Lab practical exam