



College of Natural and Computational Science
Department of Biology
Course Outline on Aquatic Science and Wetland Management (Biol 6091)

Credit: 2 (2 theoretical classes/week)

Instructors name: Seyoum Robo

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Target Group: 3rd Year second Semester

Pre-request: None

Credit Point (ECTS): 3

Mode of delivery: Block I

Academic year: 2012E.c

Semester: II

Class schedule:

Course Category: Compulsory/ core

1. Course Description:

The course deals with aquatic ecosystems of the world. Marine and inland water ecosystems; the definition of marine water, freshwater, lives in marine and freshwater, phytoplankton, zooplankton, different fish fauna in the world with special emphasis on Ethiopian fauna, chemical, biological, and physical water quality analysis; description of wetlands, aquatic (freshwater) systems and their catchments, major wetlands of the world, the wetland ecosystem, threats to wetlands and freshwater, conservation of freshwater and wetlands, international treaties and conventions on wetland and freshwater conservation.

2. Course Objective: After successful completion of this course a student will be able to:

- define inland water, freshwater and marine water
- describe biotic resources of the world aquatic ecosystem such as fish resources
- discuss contribution of wetlands to the wellbeing of animals in the area
- analyze water quality using different methods
- participate in community water conservation and pollution control activities
- discuss on international treaties on wetland and freshwater ecosystems such as the Ramsar Convention and the Nile Basin Initiative

3. Tentative Course Schedule

1. Introduction (2 hrs)
 - 1.1. Marine ecosystems (oceans, seas and estuaries)
 - 1.2. Inland aquatic ecosystems (lentic, lotic waters, wetlands):
2. Major freshwater bodies and wetlands of Ethiopia (4 hrs)
 - 2.1. Lakes
 - 2.2. Rivers
 - 2.3. Wetlands
3. Aquatic ecosystems (6 hrs)
 - 3.1. Community structure
 - 3.2. Identification of organisms
 - 3.3. Functional feeding group
 - 3.4. Allochthonous and autochthonous inputs
 - 3.5. Habitat zonation
 - 3.6. Marine ecology
 - 3.7. River and lake ecology
 - 3.8. Wetland ecology

4. Water pollution (5 hrs)

- 4.1. Types of aquatic pollution
- 4.2. Toxic substances, suspended solids (inert and oxidizable, deoxygenation, nontoxic salts (including salinization, eutrophication and algal toxins)
- 4.3. Addition of heated water, effect on buffering system;
- 4.4. Aforestation and water quality
- 4.5. Micro-organisms and pollution control (Nutritional classification; Microbial oxygen demand (inc. self-purification, oxygen balance, re-aeration, the oxygen-sag curve; the BOD test.

5. Water quality assessment (4 hrs)

- 5.1. Physico-chemical and biological surveillance
- 5.2. Sampling surface waters (inc. designing sampling programmes, mixing, safety in the field, hydrological measurements; chemical and biological sampling), Biological data (inc. pollution and diversity indices; limitations of indices; multivariate analysis), Chemical data (inc. chemical indices; mass balance and modeling)

6. Aquatic ecosystems and their catchments (2 hrs)

- 6.1. Catchment size and form
- 6.2. Catchment soils and vegetation
- 6.3. Catchment and the water body

7. Aquatic resources (Fish and fisheries): The Ethiopian fish and fisheries- classification and importance (2 hrs)

8. Water basin management and monitoring (3 hrs)

- 8.1. Basic management and monitoring programs
- 8.2. Water framework directive
- 8.3. Water quality and regulation.
- 8.4. International treaties and conventions on freshwater and wetland management
 - Field visit to local sites and collection of water samples for subsequent analysis of water parameters (biological and physico-chemical) in the lab and interpretation of the result.
 - Field trip to the surrounding lakes and rivers for the observation of conservation and management status of the major lakes and the associated wetlands
 - Collection, preservation and identification of Ethiopian freshwater organisms.

5. Teaching Learning Methods:

Lectures, field work, individual or group projects, demonstrations, group work, and self directed assignment.

6. Assessment Method

Tests20 %
Quiz.....	5%
Project work	15%
Field report and presentation.....	20%
Final exam	40%
Total	100%

8. Reference Materials

1. Allan, J.D. (1995). Stream Ecology. Chapman & Hall. London
2. Batram, J. and Balance, R. (1996). Water Quality Monitoring: A Practical Guide to the Design and Implementation of Freshwater Quality Studies and Monitoring Programmes. 1st Edition; Published on Behalf of United Nations Environment Program (UNEP)/ WHO.
3. Chapman, D. (1996). Water Quality Assessments: A Guide to Use of Biota, Sediments and Water in Environmental Monitoring. (2nd ed.) Published on Behalf of United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Environment Program (UNEP)/World health organization (WHO).
4. Cole, G.A. (1983). Textbook of Limnology. (3rd ed.) The C.V.Mosby Company, St. Louis
5. Goldman, C.R. & Horne, A.J. (1983). Limnology. McGraw-Hill Book Company, New York.
6. Kalf, J. (2002). Limnology. Printice Hall, Inc., USA.
7. Wetzel, R. (2001). Limnology: Lake and River Ecosystems. (3rd ed.). Elsevier Science, USA.

