Ecology

Syllabus

Offering Course:

Credit hours :

Instructor : Prof. Dr. Hany A. Abdel-Salam

Office Hours :

Text (available online):

Ecology

Edited by Dr. Hany A. Abdel-Salam

Course Web Page: http://ecologyforsustainableegypt.blogspot.com/

Course Description: Ecology is the scientific study of interactions among organisms and their environment. Ecology is an interdisciplinary field that includes Biology, Earth sciences, and many other sciences. Ecology is a human science as well. There are many practical applications of Ecology in Conservation Biology, Wetland Management, Natural Resource Management (Agro-ecology, Agriculture, Forestry, Agro-forestry, Fisheries), City Planning (Urban Ecology), Community Health, Economics, Basic and Applied Science, and Human Social Interaction (Human Ecology).

Grading:

15% in Class Discussion

10% Power Point Pretention

20% Mid-Term and Quizzes

15% Final Practical Exam

40% final Exam

100% (total)

Courtesy: All **cell phones** must be **turned off** during class. Please be considerate of your classmates.

Honesty: In-class exercises will be done in **groups**. Group studying can be a very effective learning tool and students are encouraged to form study groups. However, exams, quizzes and outside assignments must be your own work. All sources for your written assignment must be identified, and all direct quotations must be attributed. Disciplinary action will be initiated in any suspected case of academic dishonesty.

Disability Accommodation: Any student, who may require an accommodation, should contact me privately as soon as possible as and no later than the **end** of the **first week** of class or as soon as he or she becomes aware of the need for accommodation.

Course Outline

WEEK 1 - Introduction to Ecology

- 1- Scientific Method
- 2-What is Ecology?
- 3- Why do we study Ecology?
- 4- Differences between Ecology and Environmental Science?
- 5- Laws of Thermodynamics
- 6- Metabolism and the early atmosphere
- 7- Types of Ecosystems
- 8- Ecology of Ancient Egypt
- 9- Fauna and Flora of Egypt during the French Camping in 1798-1801 (Book of **Description of Egypt**)

WEEK 2- History of Life on Earth

- 1-Conditions on early Earth made the origin of life possible
- 2- Synthesis of Organic Compounds on Early Earth
- 3- Self-Replicating RNA and the Dawn of Natural Selection
- 3-The Fossil Record
- 4-The Origin of Mammals
- 5-The Geologic Record
- 6-The Cambrian Explosion
- 7-The Colonization of Land
- 8-Plate Tectonics
- 9-Mass Extinctions

WEEK 3 – Species at Risk

- 1- Extinct Species
- 2- Extirpated Species
- 3 - Endangered Species
- 4- Threatened Species

- 5- Species of Special Concern
- 6- Why do some species become at risk?

WEEK 4 - Earth Biomes

- 1- Habitats
- 2- Macrohabitats
- 3- Microhabitats
- 4- Succession
- 5- A pioneer community
- 6- A climax community
- 7-The Desert Biome
- 8- Animal Adaptations to the Desert Life

WEEK 5 - Aquatic Ecosystems

- 1- Marine ecosystem
- 2- Freshwater ecosystem
- 3- Lentic ecosystems
- 4-Lotic ecosystems
- 5- Biogeographical Realms

WEEK 6 – Energy Flow in Ecosystems

- 1- Photosynthesis
- 2- Ecological Pyramids
- 3- Respiration
- 4- The Concept of food chain
- 5- Grazing food chain
- 6- Detritus food chain

WEEK 7 - Biogeography of Egypt

- 1-What is Biogeography?
- Flora and Fauna of Egypt can be devided into four biogeographical regions:
- 1) Shararo-Sindian
- 2) Irano-Turanian
- 3) Mediterranean
- 4) Afro-tropical
- Distribution of Flora and Fauna of Egypt:
- 1- The Northern Coastal Strip
- 2- The Western Desert
- 3- The Eastern Desert
- 4- The Sinai Peninsula
- 5- Gebel Elba
- 6- Nile Delta and Valley

WEEK 8 - Biogeochemical Cycle or Nutrient Cycle

- 1-Carbon cycle
- 2-The global carbon budget
- 3- Water cycle
- 4-Effects of Water cycle on climate
- 5-Nitrogen cycle
- 6-Human influences on the nitrogen cycle

WEEK 9 – Natural Selection and Evolution

- 1-*Scala Naturae* and Classification of Species
- 2-Ideas About Change over Time
- 3-Lamarck's Hypothesis of Evolution
- 4-The Voyage of the Beagle
- 5-Adaptations and natural selection
- 6-The Origin of Species

- 7-Evolution is supported by scientific evidence

WEEK 10 - Biodiversity and Symbiosis

- 1- Definition of Biodiversity
- 2- Habitat destruction
- 3- Impacts of habitat destruction on organism
- 4- Human activity
- 5-Definition of Symbiosis
- 6-Type of associations
- 7-Examples for Symbiosis

WEEK 11 – Global Change

- 1- Pollution
- 2- Acid Rain
- 3- The Ozone Hole
- 4- The Green House Effect
- 5-Saving our Environment

WEEK 12- Green and Renewable Energy

- 1-Historical trends of energy use
- 2-Energy use today
- 3-Problems in the Current System
- 4-Fossil fuels
- 5- Alternative Energy
- 6- Investing in solar energy
- 7- Looking at the benefits of solar power
- **8-** Understanding the Components of Wind-Energy Systems
- **9-**Designing Wind-Energy System

WEEK 13- Conservation and Ecological Restorations

- 1- Philosophy of Ecological Restoration
- 2- What Are Restoration Goals & Objectives?
- 3- Using Reference Ecosystems
- 4- Using Ecological Succession in Restoration
- 5- Restoration Ecology Worldwide

WEEK 14 – Protected Areas and National Parks

- 1- Establishing Protected Areas
- 2- Philosophy of Nature Reserves
- 3- National Parks in Egypt
- 4- Some Examples of National parks in Egypt

Field Trips:

1-Trip to **Egyptian Museum** in Al-Tahrir Square to investigate the Ancient Fauna and Flora of Ancient Egypt.

2- Trip to the **Exhibition of Spring Flowers** of 2014 in Al-Orman Garden.

3- Trip to **Wadi Degla** National Park

4- Trip to **Wadi Al-Hitan** National Park, Al-Fayoum or **Wadi Al-Raian** National Park, Al-Fayoum

5- Trip to **Al-Ain Al-Sukhnha** to investigate the Marine environment: high tide and low tide, intertidal zone, coral reefs. Investigate wind farm which produces electricity from wind as renewable source of energy.

6- Trip to **Ragab Papyrus** and **Pharaonic Village**.

Selected General Web Sites:

Ecology at University of Benha

http://benhaecology.blogspot.com/

Global Change

http://www.globalchange.gov/

Global Warming

http://environment.nationalgeographic.com/environment/global-warming