

UNITED STATES INTERNATIONAL UNIVERSITY
ENV 2000: INTRODUCTION TO ENVIRONMENTAL SCIENCES
COURSE SYLLABUS
CREDITS: 3 UNITS

A. COURSE DESCRIPTION

- ✓ The course will explore the Earth's physical resources (air, water, soil, and minerals) and human beings' impact upon them; pollution and depletion of resources; solid waste; methods of preventing, reducing, or eliminating problems.

**B. ALIGNMENT TO THE UNIVERSITY LEARNING OUTCOMES AND
GENERAL EDUCATION OUTCOMES:**

- ✓ The course content of ENV 2000 has a direct link to attainment of the *literary* outcome and also significantly contributes to the attainment of *higher order thinking* and *career preparedness* of the university mission outcomes and the general education program learning outcomes.

C. COURSE OBJECTIVES

- ✓ The course will examine how part of nature operate and interact with the living and non-living environment
- ✓ The course will examine the distribution and characteristics of the earth's physical resources (air, water, soil and minerals)
- ✓ The course will examine the impact of human activities on the quality and distribution of these resources
- ✓ The course will review the approaches and management strategies to protect resource waste and degradation to ensure sustainability

D. TEACHING METHODOLOGY

Lectures, Power point presentation and class discussions:

- ✓ The instructor will give lectures in class to explain to the students various topics on environment.
- ✓ The lectures will take a participatory approach where the instructor will involve students by frequently asking them questions that are meant to keep alert and trigger class discussions.
- ✓ The instructor will also be free to answer questions from the students in the course of the lectures.

E. COURSE CONTENT

Week 1

- ✓ The environment: Physical, Biological and Social environment

- ✓ Life support systems of earth: Atmosphere, hydrosphere, lithosphere; The Biosphere
- ✓ Solar radiation, electromagnetic spectrum, ultraviolet radiation, impact of ultraviolet radiation of human health and on the environment
- ✓ Formation and importance of ozone; ozone layer and its location, depletion of ozone layer; causes and solution to arrest further depletion. International conventions; Vienna Convention, 1985, and Montreal Protocol, 1987

Video Show: *Our Ozone layer*

Individual assignment one:

Illustrate and explain the water cycle and cycling of matter, and the role of each in nature (Due week 4).

Week 2

Ecology and ecosystems

- ✓ Definitions, functions of the ecosystem
 - Biotic and abiotic components of ecosystems
 - Feeding relationships, trophic levels, food chains and food webs
 - Energy flow in the ecosystem
 - Ecological pyramids: pyramid of numbers, pyramid of biomass, pyramid of energy
 - Ecological productivity: gross primary productivity and net primary productivity

Week 3

Biogeochemical cycles

- ✓ Factors that sustain life on earth: One-way flow of energy and cycling of matter
- ✓ Types of biogeochemical cycles: atmospheric, sedimentary and hydrological cycles
- ✓ Atmospheric cycles: Nitrogen cycle, carbon-oxygen cycle
- ✓ Sedimentary cycle: phosphorus cycle, Sulphur cycle
- ✓ Hydrologic cycle; water cycle

Week 4

Ecological succession and population dynamics

- ✓ Ecological succession: primary and secondary succession
- ✓ Population dynamics: Carrying capacity
- ✓ Unfavorable conditions that affect ecosystems: sudden and gradual changes
- ✓ Impact of human activities on the ecosystems

Quiz: Multiple choice questions covering week 1-3

Group assignment one

Discuss the exploration of any one renewable energy resource and any two non-renewable resources of energy and their impact on the environment. What are the possible conservation measures? Due week 7

Week 5

The Earth's Physical resources

- ✓ Definition of natural resources: Examples; air, water, soil, energy, minerals, biodiversity, forests etc
- ✓ Categorization of natural resources: renewable, potentially renewable and non-renewable resources and examples in this category
- ✓ Sustainable yield of natural resources and resource degradation
- ✓ Kenya's most valuable resources and their management

Class Activity: Discuss uses of various resources

Week 6

Energy and technology

- ✓ Sources of energy, forms and transformations, renewable and non-renewable sources of energy
- ✓ Related technologies of exploiting non-renewable sources of energy and impact on the environment
- ✓ Renewable sources of energy and their technologies: solar panels, geothermal and nuclear reactors
- ✓ Strategies for conservation of energy: use of energy conservation devices, efficient use of energy, use of diverse sources of energy

Week 7

Mineral resources

- Fuel and non-fuel minerals; importance to mankind
- Metallic and non-metallic minerals
- Impacts of mineral extraction on environment
- ✓ Strategies for conservation of other resources
- ✓ World conservation strategy 1980:
 - Maintaining essential ecological processes and life support systems
 - Preserve genetic diversity
 - Sustainable use of species and ecosystem and reduction of waste
 - Caring for earth-conserving earths vitality and diversity
 - Minimizing the depletion of non-renewable resources and their degradation
 - Keeping within earth carrying capacity
 - Protection against pollution

Week 8

MID-SEMESTER EXAMINATION

Multiple choice questions	-20 = 20marks
Fill in blanks, true / false	-20 = 20marks
Structured questions	-10 = 20 marks
Total	60marks

Week 9

Food and nutrition

- Balanced diet and deficiency diseases
- Supplement/alternative sources of food nutrients
- ✓ Food preservation and storage: traditional and modern methods
- ✓ Problem associated with food storage and preservation
 - Food loss
 - Contamination and spoilage
 - Possible solutions
- ✓ Food in Kenya: farming and production patterns; impact on environment
- ✓ Kenya's national food policy

Week 10

Air pollution

- Definition and sources of pollution; harmful effects of pollutants
- Sources of air pollution; classes of air pollutants
- Effects of air pollution; on living organism and non-living things/ environment
- Prevention and reduction of air pollution
- Greenhouse gases; greenhouse effect and global warming

Week 11

Water pollution

- Definition and types of water pollutants
- Sources and courses of water pollution
- Effluents and sewage treatment
- Prevention and control of water pollution

Week 12

Solid, liquid and gaseous wastes

- Definitions, sources and generation of each type of waste
- Impact on physical resources
- Strategies for management of each of the wastes

Video shows

- Waste not Want Not*
- A livelihood from waste*

Individual assignment two: questions from the videos (Due week 12)

Week 13

Environmental hazards

- Chemical health hazards: heavy metal poisoning e.g cadmium, lead, mercury etc
 - Agrochemicals
 - Radiation-electromagnetic / solar (UV radiation)
 - Natural disasters: climate (droughts, floods, fires) geological (volcanic eruptions, land slide)
 - Biological hazards: Disease pathogens and outbreaks, vectors, locusts, snakes etc
- ✓ Promoting good health through
- Promotion of adequate and clean water, sanitation facilities
 - Destruction of habitats of disease pathogens and vectors
 - Maintaining cleanliness and beauty of the environment
 - Reducing effects of environmental hazards

Class activity: Revision

Week 14

FINAL EXAMINATION AS SCHEDULED

Multiple choice questions	-40 = 40marks
Fill in blanks, true / false	-30 = 30marks
Structured questions	-10 = 20 marks
Total	90marks

- ✓ This will test the students ability to;
- Apply intellectual knowledge to practical tasks
 - Apply basic scientific, quantitative and technological skills in a changing environment
 - Collect, analyze and evaluate data/information to formulate valid conclusion
 - Demonstrate the ability to reason critically and creatively in an interdisciplinary context

COURSE EVALUATION

Attendance and participation	10%
Groupwork and individual assignments	10%
Quick quizzes	10%
Term paper**	15%
Mid-quarter exam	25%
Final examination	30%
Total	100%

- ✓ Please note that 5 (five absences from class will automatically result to a grade F)
- ✓ Assignments handed in late will not be marked

TERM PAPER INSTRUCTIONS

- ✓ Students are reminded that term papers are research undertakings on topical issues and are therefore expected to do extensive reading referencing and analysis before writing up. All works must be properly cited. The paper should not be more than ten (10) typed pages in Times Roman 12 font.

COURSE TEXT

Miller G. T. (Jnr) (2002) Living in the Environment 12th Edition. Wadsworth Publishing Co.

OTHER RECOMMENDED TEXTS

- ✓ Nebel B.J. & Wright R.T. (1996) Environmental Science – The Way the world works, 5th Edition. (*Prentice Hall*).
- ✓ Marsh W.M. & Grossa Jnr. J.M. (1996) Environmental Geography: Science, landuse and Earth Systems. *John Wiley and Sons*.
- ✓ Deshmukh I. (1986) Ecology and Tropical Biology. Blackwell Scientific publications.
- ✓ Ewusie J.Y (1986) Elements of Tropical Ecology. *ELBS*
- ✓ Boughey S. A (1975) Man and Environment: An introduction to Human Ecology and Evolution. New York: McMillan Publishing Co.
- ✓ Otiende J.E. *et al.* (1991) An introduction to Environmental Education. *Nairobi University Press*
- ✓ Dasman R.F (1984) Environmental Conservation. John Wiley & Sons: New York
- ✓ Elson D. (1987) Atmospheric pollution: Causes, Effects and Control policies. *Blackwell Scientific Publications*.
- ✓ Dix H.M. (1981) Environmental Pollution: Atmospheric, Land, Water and Noise. *London. John Wiley*.
- ✓ The internet resources.

GRADING

A	90-100
A-	87-89
B+	84-86
B	80-83
B-	77-79
C+	74-76
C	70-73
C-	67-69
D+	64-66
D	62-63
D-	60-61
F	0-59

CONSULTATION HOURS

Wed 12.30 – 1:30 PM