

(Env. Ed.)
Full marks:100
Teaching hour: 150

Environmental Education Grade- XI

1. Introduction

This course addresses three aspects of environment, namely (a) The national education objectives related to environment, (b) Country's growing concern about environmental degradation, and (c) The academic opportunities for study environment subject. Objectives of national education system emphasizes teaching of thoughtful protection and wise use of country's natural resources, helping the individuals lead a socially harmonious lives in the modern world, and helping the modernization process of the country creating capable manpower for its development.

The modern world is threatened by increasing environmental degradation and natural as well as anthropogenic hazards. There is growing demand for making people aware of consequences of environmental degradation and stimulating them to act wisely to protect the environment.

Opportunities for higher education in environmental science and environmental education are available. Teaching on these disciplines has been initiated at primary as well as secondary school levels. Demand for academically qualified and methodologically skilled teaching manpower will increase in future. This background has prompted the implementation of the environmental education course in the higher secondary school level. Implementation of this course will help to produce potential teachers who:

- (a) are able to teach environmental subjects in primary and lower secondary schools;
- (b) can qualify themselves to pursue bachelor level studies in environmental education;
- (c) are conscious about the wise use of country's natural resources without damaging the environmental balance and
- (d) are able to act thoughtfully to protect the environment.

2. General objectives

The general objectives of the course is to develop the potential manpower which are well aware of environmental issues and their underlying cause, measure to minimize environmental degradation and who are able to stimulate themselves to take necessary actions to protect the environment, including teaching the students of lower secondary level.

3. Specific objectives

On completion of the course the students should be able to:

1. describe the concept, importance and components (scope) of environmental education;
2. define the meaning of environment, its importance and elements;
3. explain eco-system with emphasis on inter-relationship between human being and environment;
4. explain the courses and effects of environmental degradation;
5. describe the concept and effects of environmental degradation;
6. describe the mitigation measures to protect environmental degradation;
7. describe the major types of natural hazards in Nepal and their possible methods of mitigation and
8. explain measures of pollution control.

Course Contents

Unit I **Introduction** (10 Teaching hours)

1. Meaning and scope of environment
2. Importance of environment
3. Elements of environment
 - (a) Physical: land, water, air (atmosphere), energy
 - (b) Chemical
 - (c) Biological: plants, animals, human beings
 - (d) Social / cultural
4. Meaning and definition of environmental education

Unit II **Ecology and Eco-System** (40 teaching hours)

1. Concept of Ecology
 - a. Introduction
 - b. Ecological factors, biotic and abiotic factors, interaction between abiotic and biotic factors.
2. Concept of ecosystem
 - a. Introduction
 - b. Food chain and food web
 - c. Trophic level
 - d. Ecological pyramid and its type (pyramid of number, pyramid of biomass and pyramid of energy)
 - e. Productivity and its type (primary productivity and secondary productivity)
 - f. Types of ecosystem

Water ecosystem (pond ecosystem) and Terrestrial ecosystem (grass land ecosystem)

3. Concept of community and succession.
4. Biogeochemical cycle
 - a. Carbon cycle
 - b. Nitrogen cycle
5. Conservation of Natural resources.
 - a. Introduction
 - b. Methods of conservation of natural resources
 - c. Types of natural resources

Water resources

Use and important of water resources, Problem and Conservation of water resources.

Forest resources

Importance of forest, forest conservation or forest management.

Wild life resources

Categories of wild life, endangered wild life of Nepal, Causes of extinction of wildlife, conservation and management of wildlife. Types of flora and fauna in different region of Nepal.

Wildlife reserves of Nepal, National parks of Nepal.

- d. Interrelationship between man and natural resources
- e. Effects of human activities on natural resources and importance of biodiversity

Unit III Environmental Pollution (35 teaching hours)

1. Introduction: Causes of environmental pollutions; local, national, regional and global issues of environmental pollutions.
2. Air: Introduction to physical structure and function of the atmosphere, composition of natural atmosphere, sources of air pollution, effects of air pollution on human health, animals, plants, ecosystem, and materials; air quality standards and criteria pollutants; introduction to aerosol, green house effects, ozone layer depletion, phenomenon of acid rain and possible global environmental consequences.
3. Water: Hydrologic cycle, sources of water, drinking water quality standard, sources of water pollution, qualitative indicators of water quality, common practices and methods to protect local water sources and to prevent from contamination.
4. Soil: Origin and nature of soils, soil profile, soil properties and classification; soil degradation, introduction to major types of soil pollutants and their sources: heavy metals, organic and inorganic pollutants, agrochemicals; introduction to land pollution indicators and common practices of soil remediation.

5. Sound: Nature of sound, difference between sound and noise, sources of noise, noise criteria, common methods and practices for controlling noise.
6. Radiation: Basic introduction to radioactivity and radioactive units, sources of radioactive radiation, effects of radiation on environment and human health.

Unit IV Natural Hazards (35 teaching hours)

1. Introduction: Introduction to minerals and rocks, faults, folds and joints, internal and external features of the earth, plate tectonics, physical feature of Nepal, weathering, soil formation and its characteristics, geological actions of rivers, glaciers, wind, groundwater.

2. Natural hazards:

Flood: Causes, flood situation in Nepal and adjoining countries, its effects on people and environment, mitigation measures.

Drought: causes of draught and its effects on people and environment

Landslides and debris flows: definition, types and causes (both natural and man made), landslide and debris flow problems in Nepal and its effects on people and environment, mitigative measures.

Earthquake: nature and definition of earthquake, causes and mechanism of earthquake, focus and epicenter, Earthquake magnitude and intensity, history of earthquakes in Nepal and its possibility of occurrence in future, preparedness for earthquake disasters, tsunami.

Glacial Lake Outburst Floods (GLOF): Definition, nature and causes of formation of glacial lakes, their distribution in Nepal, effects of GLOF on people and environment.

Volcanoes: definition, and types, volcanic cones and craters, types of lavas, types of volcanic hazards.

Unit V Environmental Degradation and Mitigation measures

(20 teaching hours)

1. Environmental degradation

Nature and characteristics of environmental degradation caused by Soil erosion, deforestation, industrialization, urbanization, over exploitation of natural resources, over population.

2. Concept and importance of mitigation measures.

3. General measures for mitigating environmental degradation:

- (a) Promotion of environmental and conservation education.
- (b) Environmental stewardship: concept and measures.
- (c) Maintaining natural balance.
- (d) Pollution control.
- (e) Environmental sanitation measures.

- (f) Afforestation
- (g) Soil conservation
- (h) Population control / family planning
- (i) Proper human settlement / planned urbanization
- (j) Environmental legislation and monitoring, Kyoto protocols, Rio Declaration.

Practical (10 teaching hours)

Study of rocks and minerals, study of contour maps, Determination of soil pH, moisture content, determination of soil profile in the field, study of quality of water in pond, river and other sources, preparation of instructional materials from any theoretical topics of above units, study of pond, river and land ecosystem. Field visits and reporting on natural hazard and environmentally problematic sites.

Prescribed text books:

Suitable text book to be developed.

Reference materials:

1. Pandit Chida Nanda, fundamental of Environmental education. K.P. publication, Kathmandu, 2001.
2. IUCN, Batabaran Sikshya shrot Sangalo series, IUCN, lalitpur, 2050-2053
3. IUCC Batabaran Shabdabali, IUCC, 2053
4. Timisena, TAtwa, Our planet, (Hamro Prithvi), Nepal forum for Environmental Journalist, Kathmandu, 1993.
5. Plumber, Joy abd Phillip Neal, the handbook of Environmental education, London, 1994.
6. Timisena, Tatwa, Environmental Pollution (in Nepal Youth in Environment, Kathmandu, 1993).
7. Posters on animals and plants of Nepal produced by IUCN
8. Neupane, Ishwor prasad, Batabaran Sikshya. Taleju prakashan, 2061
9. Dr. Chida Nanda Pandit, Pushpa Raj Dhakal –Elementary environmental education (Nepali medium), Bidur Prakashan , Kathmandu, 2062.

(Env. Ed.)
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Environmental Education Grade -XII

2. Introduction

This course addresses three aspects of environment, namely (a) The national education objectives related to environment, (b) Country's growing concern about environmental degradation, and (c) The academic opportunities for study environment subject. Objectives of national education system emphasizes teaching of thoughtful protection and wise use of country's natural resources, helping the individuals lead a socially harmonious lives in the modern world, and helping the modernization process of the country creating capable manpower for its development.

The modern world is threatened by increasing environmental degradation and natural as well as anthropogenic hazards. There is growing demand for making people aware of consequences of environmental degradation and stimulating them to act wisely to protect the environment.

Opportunities for higher education in environmental science and environmental education are available. Teaching on these disciplines has been initiated at primary as well as secondary school levels. Demand for academically qualified and methodologically skilled teaching manpower will increase in future. This background has prompted the implementation of the environmental education course in the higher secondary school level. Implementation of this course will help to produce potential teachers who:

- (e) are able to teach environmental subjects in primary and lower secondary schools;
- (f) can qualify themselves to pursue bachelor level studies in environmental education;
- (g) are conscious about the wise use of country's natural resources without damaging the environmental balance and
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2. General objectives

The general objectives of the course is to develop the potential manpower which are well aware of environmental issues and their underlying cause, measure to minimize environmental degradation and who are able to stimulate themselves to take necessary actions to protect the environment, including teaching the students of lower secondary level.

3. Specific objectives

On completion of the course the students should be able to:

1. describe how environmental education can help for sustainable development;
2. list and describe the agencies involved in environmental education in Nepal;
3. explain environmental situation in Nepal;
4. describe and apply various methods of teaching environmental education in lower secondary school level;
5. select, prepare and use materials required for teaching environmental education course and
6. plan and evaluate teaching environmental education.

Course Contents

Unit I **Environmental problems and Sustainable Development in Nepal (20 teaching hours)**

1. Interrelationship between development and environment.
2. Principles of sustainable development.
3. Environmental stewardship and sustainable development.
4. Unique features of environment of Nepal-physiographic, climatic, biotic variations
5. Cultural heritage of Nepal
6. Major environmental problems in Nepal and their effects.
7. National policy on environment and environmental education.
8. Role of environmental education in sustainable development.

Unit II **Environmental Sanitation (20 teaching hours)**

1. Introduction
2. Causes and effects of poor sanitation
3. Communicable diseases-airborne diseases, food- and water-borne diseases, their preventive and control measures
4. Solid Waste: Definition of solid waste, sources and types of solid waste, composition of municipal solid wastes in Nepal, hazardous waste, solid wastes management and safe disposal.

Unit III **Environment related institutions in Nepal (15 teaching hours)**

Role, scope and activities of the following institutions on environmental protection:

1. National institutions:

Ministries of Population and Environment, forest and soil Conservation,, Industries, health and Solid waste management and resource Management Centre/HMG

2. International agencies:

World Wide Fund for Nature (WWF), UNEP, IUCN-the World Conservation Union, International Centre for Integrated Mountain Development (ICIMOD), United Nations Environment Protection (UNEP)

Unit IV School level Environment curriculum in Nepal (15 teaching hours)

1. Meaning and definition of environmental curriculum
2. Importance of environmental education curriculum
3. Objectives and scope of environmental education curriculum
4. Environmental education in Nepal.
5. Overview of primary and lower secondary level curriculum on environment in terms of objective and content (sequence and scope)

Unit V Methods of Teaching Environmental Education (20 teaching hours)

1. Concept, philosophy/maxim, selection and principles of teaching methods of environmental education.
2. Factors determining choice of method
3. Concept focused teaching methods: lecture, discussion, demonstration, inquiry, experiments, question answer and seminar.
4. Activity focused teaching methods: role-play, audio-visual presentation, informational materials development projects, creative arts, environmental games and field trip.

Unit VI Materials and Media for Teaching Environmental Education (30 teaching hours)

1. Concept, importance and selection of materials and media for environmental education.
2. Various types of materials and media used in teaching environmental education.
3. Criteria for selection of educational materials and media.
4. Preparation and use of materials for teaching environmental education.
5. Sources of educational materials and media.

Unit VII Planning and Evaluation of Teaching Environmental Education (30 teaching hours)

1. Concept and importance of planning of teaching.

