Department of Environmental Science
University School of Vocational Studies and Applied Sciences
Guatam Buddha University

Compulsory Six months Core Module Course ES 101Environmental Studies (Credit: L-T-P: 04 (04-0-0) for undergraduate programme in all branches of Higher Education as "Ability Enhancement Compulsory Course (AECC)"

(Ref: The Secretary UGC, New Delhi D.O. No. F.13-1/2000/ EA/ENV/COS-I dated 22nd May, 2019 and D.O. No. F.13-//2000 (EA/ENV/SOS-I) dated14th May, 2019

ES 101: ENVIRONMENTAL STUDIES
CREDIT: L-T-P: 4 (4-0-0)

OBJECTIVE

To impart knowledge on environment and environmental issues and challenges of local, national and global significance for achieving environmental security and sustainable living

OUTCOME

To knowledge and awareness so generated will enhance ability of the learners for conservation of environment and natural resources for a healthy planet Earth, and happy living of the present and future generations.

CONTENTS

Unit 1 : Introduction to Environmental Studies (2 lectures)

- Multidisciplinary nature of environmental studies; components of the Earth's environment- atmosphere, hydrosphere, lithosphere and biosphere
- Scope and importance; Concept of sustainability and sustainable development

Unit 2 : Ecosystems (6 lectures)

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems :

a) Forest ecosystem
b) Grassland ecosystem
c) Desert ecosystem
d) Aquatic ecosystems (pond, stream, lake, river, ocean, estuary)

Unit 3 : Natural Resources : Renewable and Non- renewable Resources (8 lectures)

- Land resources and land-use changes; Land degradation, soil erosion and desertification
- Deforestation: Causes and impacts due to mining and dam building on environment, forest, biodiversity and tribal population
- Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state)
- Heating of Earth and circulation of air; air mass formation and precipitation
- Energy resources: Renewable and non-renewable energy resources, use of alternate energy sources, growing energy needs, case studies

Unit 4 : Biodiversity and Conservation (8 lectures)

- Levels of biological diversity : genetic, species and ecosystem diversity; Bio-geographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, human-wildlife conflicts, biological invasion; Conservation of biodiversity: *In-situ* and *Ex-situ* conservation of biodiversity
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and informational value

Unit 5 : Environmental Pollution (8 lectures)

- Environmental pollution : Types, causes, effects and control; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial wastes
- Pollution-related case studies

Unit 6 : Environmental Policies and Practices (7 lectures)

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention and Control of Pollution)

Act; Water (Prevention and Control of Pollution) Act; Wildlife (Protection) Act; Forest (Conservation) Act; International agreements: Montreal and Kyoto protocols, and Convention on Biological Diversity (CBD)

- Nature reserves, tribal population and rights and human-wildlife conflicts in Indian context

Unit 7 : Human Communities and the Environment (6 lectures)

- Human population growth: Impacts on environment, human health and welfare, Carbon foot print
- Resettlement and rehabilitation of project-affected persons; case studies

- Disaster management : Floods, earthquakes, cyclones and landslides
- Environmental movements : *Chipko*, Silent valley, *Bishnois* of Rajasthan
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation
- Environmental communication and public awareness, case studies (e.g.,CNG vehicles in Delhi)

Unit 8 : Field Work (Equal to 5 lectures)

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site- Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds and basic principles of identification
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

SUGGESTED READINGS

Carson, R., 2002, *Silent Spring*, Houghton Mifflin Harcourt, Boston.

Gadgil, M., and Guha, R. 1993. *This Fissured Land: An Ecological History of India,* University California Press, California.

Gleeson, B. and Low, N. (Eds.) 1999. *Global Ethics and Environment*, Routledge, London.

Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Development, Environment and Security. Stockholm Environmental Institute, Oxford University Press, Oxford.

Groom, M.J., Meffe, G.K. and Carroll, C.R. 2002 *Principles of Conservation Biology*, Sinauer Associates, Sunderland.

Grumbine, R. E., and Pandit, M.K., 2013. Threats from India's Himalayan dams, *Science* 339: 36-37.

McCully, P.,1996. *Rivers No More: The Environmental Effects of Dams,* Zed Books, London.

McNeill, J. R, 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*, Norton, New York.

Odum, E.P., Odum, H.T. and Andrews, J., 1971, *Fundamentals of Ecology*, Saunders, Philadelphia.

Pepper, I.L., Gerba, C.P. and Brusseau, M.L. 2011, *Environmental and Pollution Science*, Academic Press, New York.

Rao, M.N. and Datta, A.K., 1987. *Waste Water Treatment,* Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.

Raven, P.H., Hassenzahl, D.M. and Berg, L.R., 2012. *Environment,* 8th Edition, John Wiley and Sons, New York.

Rosencranz, A., Divan, S., and Noble, M. L. 2001. *Environmental Law and Policy in India,* Oxford University Press, New Delhi.

Sengupta, R., 2003. *Ecology and Economics*: *An Approach to Sustainable Development*, Oxford University Press, New Delhi.

Singh, J.S., Singh, S.P. and Gupta, S.R., 2014, *Ecology, Environmental Science and Conservation,* S. Chand Publishing Co. P. Ltd., New Delhi.

Sodhi, N.S., Gibson, L. and Raven, P.H. (Eds). 2013. *Conservation Biology*: *Voices from the Tropics,* John Wiley and Sons, New York.

Thapar, V. 1998. *Land of the Tiger*: *A Natural History of the Indian Sub-continent,* University of California Press, California.

Warren, C. E.1971. *Biology and Water Pollution Control*, WB Saunders, Philadelphia.

Wilson, E. O. 2006. *The Creation: An Appeal to Save Life on Earth,* Norton, New York.

World Commission on Environment and Development. 1987. *Our Common Future,* Oxford University Press, Oxford.

WEBSITE

www.nacwc.nic.in
www.opcw.org
www.undp.org
www.cbd.int
www.unfccc.int