



# **TRIPURA UNIVERSITY**

**(A Central University)  
Suryamaninagar-799022**

**Syllabus**

**OF**

**Environmental Science  
(IV & V)**

**2014**

# TRIPURA UNIVERSITY

(A Central University)

B.Sc. Environmental Science Syllabus

(Elective)

## Fourth Semester, Paper – 4A

### Unit –I (ES09): Ecotoxicology and Environmental health

Pesticides – types and mode of action; Bio-entry, Bioaccumulation, Bio-transformation and Biomagnifications ; Persistent Organic Pollutants (Organochlorine), Concept of LD50 and LC 50, Concept

of xenobiotics, indices of toxicology, mutagens, carcinogens and teratogens and mutagens – their effects on human system, Concept of environmental health, water borne, Air borne and Vector born diseases, Causes and remedial measures of Malaria, Arsenikosis, and Amoebiosis. Toxins of biological origin; Occupational health. Epidemiological Issues - Goiter, Fluorosis.

### Unit – II (ES10) Remote sensing and GIS

Definition, principle and kind of remote sensing, types of images and data, aerial photographs, resolution,

pixel, electromagnetic spectrum, Global positioning system, data interpretation, mapping, False colour composing, Normalized Differential Vegetation Index, Reflectance pattern of different surfaces, application of remote sensing and GIS in environmental management.

8

### Suggested Readings:

1. Bahl, A and Bahl, B.S. 2005. A textbook of Organic Chemistry. Seventeenth Edition. S.Chand & Company, New Delhi.
2. Barrett, E.C. and Curtis, L.F. 1999. Introduction to Environmental Remote Sensing. Routledge, Taylor and Francis, New York.
3. Bhagi, A.K. and Chatwal, G.R. 2003. Environmental Chemistry. Himalaya Publishing House, New Delhi.
4. Bhatta, B. 2011. Remote Sensing and GIS. Oxford University Press, New York.
5. Butter, G.C. (ed). 1978. Principles of Ecotoxicology. Scope 12. John Wiley & Sons, New York.
6. Dara, S.S. 2010. A Textbook of Environmental Chemistry and Pollution Control. Fifth Edition. S. Chand & Co. Ltd., New Delhi.
7. De, A.K. 2004. Environmental Chemistry. New Age International Pvt. Ltd., New Delhi.
8. Gupta, P.K. 2010. Modern Toxicology Vol. I-III. Metropolitan Book Co. Pvt. Ltd., Delhi.
9. Hayes, W.A. 2001. Principles and Methods of Toxicology. CRC Press, New York.
10. Klaassen, C.D and Watkins, J.B. 2003. Essentials of Toxicology. McGraw-Hill Professional, New Delhi.
11. Lillesand, T.M. and Kiefer, R.W. 2004. Remote Sensing and Image Interpretation. Fifth Edition. John Wiley, Cambridge.
12. Masters, G.M. and Wendell, E. 2008. Introduction to Environmental Engineering and Science. Third Edition. Prentice-Hall India Pvt. Ltd., New Delhi.

13. Pelczar, Jr. M.J, Chan, E.C.S. and Krieg, N.R. 2009. Microbiology. Fifth edition. Tata McGraw-Hill, New Delhi.
14. Pery, G. 1980. Introduction to Environmental Toxicology. Elsevier, Amsterdam.
15. Sharma, B.K. and Kaur, H. 2004. Environmental Chemistry. Krishna Prakashan Mandir, Merrut.
16. Siddiqui, M.A. 2005. Introduction to Geographical Information System. Sharda Pustak Bhawan, Allahabad.
17. Spiro, T.G. and Stigliani, W.M. 2003. Chemistry of the Environment. Second Edition. Prentice-Hall of India Pvt. Ltd., New Delhi.
18. vanLoon, G.W. and Duffy, S.J. 2000. Environmental Chemistry - A global perspective. Oxford University Press, New Delhi.
19. Walker, C.H. , Sibly R.M., Hopkin S.P., and Peakall D.B. 2012. Principles of Ecotoxicology. Fourth Edition. CRC Press, New York.
20. Wing, M.G. and Bettinger, P. 2008. Geographic Information Systems: Applications in Natural Resource Management. Oxford University Press, New York.
21. Wright, D.A. and Welbourn, P. 2002. Environmental Toxicology. Cambridge University Press, London.

**TRIPURA UNIVERSITY**  
(A Central University)  
B.Sc. Environmental Science Syllabus  
(Elective)

**Fourth Semester, Paper – 4B (Practical)**

1. Determination of *Coliform* count in natural waters.
2. Study of root nodules of a nitrogen fixing plant.
3. Estimation of nitrate and phosphate content in natural waters.
4. Demonstration on the use of GPS.
5. Preparation of area map by using GPS.
6. Demonstration on the use of ARC-GIS software.
7. Determination of Height and Distance of an object from ground with Clinometer.
8. Visit to a place/ area/ locality promoting biodiversity conservation and preparation of field report using GIS.
9. Demonstration and editing of Scientific photography and videography
10. Visit to a health institution and preparation of health report.

**Suggested Readings:**

1. Gurumani, N. 2006. Research Methodology for Biological Sciences. MJP Publishers, Chennai.
2. Chadda, A. 1989. Agricultural Statistics in India. Suman Book House, New Delhi.
3. Tripathi, B.D. and Govil, S.R. 2001. Water Pollution (An Experimental Approach). CBS Publishers and Distributors, New Delhi.
4. Kaur, K. 2007. Handbook of Water and Wastewater Analysis. Atlantic Publishers and Distributors (P) Ltd., New Delhi.
5. Maiti, S.K. 2003. Hand Book of Methods in Environmental Studies. Vol. I and II. ABD Publishers, Jaipur.
6. Sharma, P.D. 2003. Ecology and Environment. Rastogi Publications, Meerut.
7. Awasthi, D.D. 2000. A Handbook of Lichens. Bishen Singh Mahendra Pal Singh, Dehradun.

**TRIPURA UNIVERSITY**  
(A Central University)  
B.Sc. Environmental Science Syllabus  
(Elective)

**Fifth Semester, Paper – 5A**

**Unit –I (ES11): Disaster management and Traditional knowledge system**

Nature and types of Disaster, Earthquake, Tsunami; Disaster management plans, Roles and regulatory functions of NIDM and NDMA in disaster management. Intellectual Property Rights, Traditional Agroforestry

system, Traditional Water Harvesting system and Traditional health care system; Ethno-biology Wild Edibles.

**Unit – II (ES12): Environmental Biotechnology and Management**

Management of Municipal Solid Waste, Biomedical waste, Hazardous waste and Electronic waste, Integrated pest management; Biopesticides, Bio-fertilizer, Vermicomposting and its importance. Environmental monitoring; environmental audit and reporting; major environmental acts: Air, Water, Wildlife and Biodiversity; Concept of Sustainable Development; Joint Forest Management; Environmental Impact Assessment (EIA); Environmental management Plan.

**Suggested Readings:**

1. Abbasi, S.A. and Ramasami, E. 1999. Biotechnological Methods of Pollution Control. University Press, Hyderabad.
2. Chiras, D.D. and Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future. Addison Wesley, Boston.
3. Flintan, F. and Tedla, S. 2010. Natural Resource Management: The impact of gender and Social Issues. IDRC, New Delhi.
4. Gupta, H.C.L., Siddiqui, A.U. and Parihar, A. 2010. Biopest Management (Entomopathogenic Nematodes, Microbes & Bioagents). Agrotech Publishing Academy, Udaipur.
5. Gupta, P.K. 2007. Elements of Biotechnology. Rastogi Publications, Meerut.
6. Jain, S.K. (ed) 1981. Glimpses of Indian Ethnobotany. Oxford and IBH, New Delhi.
7. Jain, S.K. 2004. Manual of Ethnobotany. Scientific Publishers, Jodhpur.
8. Jemba, P.K. 2004. Environmental Microbiology. Science Publishers, New Hampshire.
9. Khan, I.A. 2000. Environmental Law. Central Law Agency, Allahabad.
10. Murugesan, A.G. and Rajakumari, C. 2006. Environmental Science and Biotechnology. MJP Publishers, Chennai.
11. Negi, S.S. 2000. Forest Law (with explanations). Oscar Publications, Delhi.
- 11
12. Pandey, H.N. 2010. Sacred Forests – Their Ecology and Diversity. Regency Publications, Delhi.
13. Priyasankar Choudhuri (2006), Kenchor Jeeban Baichitra O Kencho Projukti, Jyan

Bichitra Prakashani, Agartala.

14. Raina, M., Pepper, I. and Gerba, C. 2006. Environmental Microbiology. Academic Press, New York.
15. Sands, P. 2003. Principles of International Environment Laws. Cambridge University Press, London.
16. Scrogg, A. 2005. Environmental Biotechnology. Second edition, Oxford University Press, New York.
17. Somani, L.L., Shilpkar, P. And Shilpkar, D. 2011. Biofertilizers – Commercial Production Technology & Quality Control. Agrotech Publishing Academy, Udaipur.
18. Srivastava, M.L. 2003. Basic Environmental Microbiology. Manohar Books, New Delli.
19. Thapar, S.D. 1975. India's Forest Resources. Macmillan India, New Delhi.
20. Tiwari, B.K., Barik, S.K. and Tripathi, R.S. 1999. Sacred forests of Meghalaya: biological and cultural diversity. Regional Centre: NAEB, North-Eastern Hill University, Shillong.
21. Trivedi, P.C. 2010. Bioremediation of wastes and Environmental Laws. Aavishkar Publishers, Distributors, Jaipur.
22. Trivedi, R.K. 2004. Handbook of Environmental Laws, Acts, Guidelines, Compliance and Standards (Vol. I and II). B.S. Publications, Hyderabad.
23. Zafar, R. 2002. Medicinal plants of India. CBS Publishers & Distributers, New Delhi.

**TRIPURA UNIVERSITY**  
(A Central University)  
B.Sc. Environmental Science Syllabus  
(Elective)

**Fifth Semester, Paper – 5B (Practical)**

1. Preparation of Pre disaster, disaster and post disaster plans for earth quake disaster.
2. Measurement of girth, height and volume of tree bole.
3. Determination of similarity and dissimilarity by Morisita Index and Bray Curtis methods.
4. Determination of Simpson Diversity Index ( $\lambda$ ) in a forest community.
5. Study of important ethno-medicinal plants with the help of herbarium.
6. Determination of texture of given soil sample.
7. Identification of plants of a grassland and forest community.
8. Preparation of vermicompost.
9. Preparation of environmental models on Global warming , Climate change, Water harvesting technique etc.
- 12
10. Study of edible insects and molasses of different tribes of Tripura.

**Suggested Readings:**

1. Charles, P. and Vincent, J.R. 2003. Natural Resource Accounting and Economic Development: Theory and Practice. Edward Elgar Publishing Ltd., Cheltenham.
2. Haab, T. and McConnell, K.E. 2003. Valuing Environmental and Natural Resources. Edward Elgar Publishing Ltd., Cheltenham.
3. Ghosh, S.K. and Singh, R. 2003. Social Forestry and Forest Management. Global Vision Publication, Delhi.
4. Khanna, L.S. 1985. Forest Mensuration. International Book Distributors, Dehradun.
5. Principles and methods of Geographic Information Systems and Science, Paul A. Longley, Prentice-Hall.