

# UNIVERSITY OF LADAKH



**SYLLABUS  
OF  
THE INTERDISCIPLINARY COURSE  
IN  
ENVIRONMENTAL SCIENCES  
(UNDER NEP – 2020)**

**(To be Implemented w.e.f Academic Session 2023-24)**

# UNIVERSITY OF LADAKH

## SYLLABI OF THE INTER-DISCIPLINARY COURSE IN Environmental Science UNDER NATIONAL EDUCATION POLICY - 2020 (Session 2023-2024)

Semester – I

Credits: 03 (Theory)

Course Title: *Environment Health and Waste Management*

Max. Marks: 75

Course Code: EES-ES-101-G

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### Course Objectives:

- To attain an understanding of the various aspects of environmental health.
  - To acquaint with the knowledge of waste management practices for a healthy environment
  - To get an idea about the waste management laws in India.
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### THEORY (3 credits – 45 Teaching Hours)

#### Unit I: Introduction to environmental Health

15 Hours

- 1.1. Concept of environmental health, toxicology and epidemiology
- 1.2. Risk assessment and management; Major sources of environmental health risks
- 1.3. Population and environmental resources; Food safety- sources of contamination and control
- 1.4. Climate change and environmental health
- 1.5. Sanitation and hygiene; Health education and promotion

#### Unit II: Waste Management

15 Hours

- 1.1. Sources and management of solid waste, their classification and chemical composition
- 1.2. Impact of solid waste on environment, human health and plant; Types of industrial waste (hazardous and non-hazardous)
- 1.3. Impact of solid waste and industrial effluents discharge on water quality (surface and ground water)
- 1.4. Techniques used in collection, storage, transportation and disposal of solid waste (landfill techniques traditional and sanitary land fill technique); Concept of waste to energy; bioremediation; Drawbacks of waste management techniques.

#### Unit III: Waste management laws in India

15 Hours

- 1.1 Overview of waste management in India; importance of legal and regulatory frameworks;
- 1.2 Waste Management Laws in India-The Environmental Protection Act, 1986; The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008;
- 1.3 The Plastic Waste (Management and Handling) Rules, 2011; Bio-Medical Waste (Management and Handling) Rules, 1998;
- 1.4 The E- Waste (Management and Handling) Rules, 2001; The Batteries (Management and Handling) Rules, 2001.

### REFERENCES

#### Essential Readings

1. Karen Hardt (2018). "Solid Waste Management", Callisto Reference.

2. Bharagava,R.N.,Chowdhary,P.,(2019). “Emerging and Eco-Friendly Approaches for Waste Management” 1st ed. Springer.
3. Marfe,G., Stefano,C.D.,(2020). “Hazardous Waste Management and Health Risks”, Bentham Science Publishers
4. Biswas, A.(2006). “Water management and Environmental Challenge”.New Delhi : Oxford University Press.
5. Frumkin,H.,(2016). “Environmental Health: From Global to Local”, 3rd Edition, Wiley.
6. Deborah A. Falta,(2021)“Understanding Environmental Health: How We Live in the World”Jones and Bartlett Publishers, Inc.

### **Suggested Readings**

1. Whittaker,D.,(2018), “Integrated Waste Management”, Callisto Reference.
2. Pires,A., Martinho,G., Rodrigues,S.,Gomes,M.I., (2019). “Sustainable Solid Waste Collection and Management” 1st ed. Springer.
3. Anjaneyulu, Y. (2002). Environmental Impact Assesment Methodologies. BSP BS Publications, Hyderabad.
4. Henry, J. G and Heinke, G. W. (2016). Environmental Science and Engineering. Pearson.
5. Dade W. Moeller., (2004), “Environmental health”.Harvard University Press.

# UNDERGRADUATE INTER-DISCIPLINARY COURSE IN Environmental Science (NEP-2020)

## **Semester – II**

Course Title: *Bio-resources Management*

Course Code: EES-ES-201-G

Credits: 03 (Theory)

Max. Marks: 75

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### **Course Objectives:**

- To develop an understanding of the nature and scope of bio resource.
  - To Acquire knowledge with respect to the properties of the bio resources.
  - To learn about the major policies of bio resource management.
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## **THEORY (3 credits – 45 teaching Hours)**

### **Unit I: Bio-resources and Livelihood**

**15 Hours**

- 1.1. Bio-resources: Concept and classification of natural and anthropogenic bio-resources; Importance of bio-resources and their utilization.
- 1.2. Plant resources, its uses and consequences of overexploitation; Medicinal Plant resources of Ladakh-an overview.
- 1.3. Food resources; sources of food; Green revolution; concept its success and consequences in India. Status and scope of agriculture, fisheries, sericulture and forestry in Ladakh.
- 1.4. Threats to traditional Livelihood, Food insecurity, Impact of globalization and urbanization on livelihood and bio-resources; Energy crisis and need of green energy; Concept of Green Economy and Bio-villages.

### **Unit II: Bio-resource Industries**

**15 Hours**

- 1.1 Bio-industry: Concept, recent trends in the development of Bio-industry; Scope and status of Bio-industries in India (Dairy, Sheep, Floriculture, Horticulture).
- 1.2 Bio-industries and Green economy: Marketing strategies for Bio-resources products, Product launching, evaluation and advertisements, value addition.
- 1.3 Bio-based waste utilization: Composting, vermicomposting; Pulping (mechanical and chemical pulping); Municipal Solid Wastes: Concept, Recycling and Waste to energy conversion; Concept of Bio-based plastics and fibres; Bio-fuels.
- 1.4 Bio-industry and Entrepreneurship: Status and scope of establishing bio-based small scale industries (Cosmetics, Fertilizers, Leather, aquaculture, Ornamental and Herbal Medicine); Concept of Green entrepreneurship.

### **Unit III: Bio-resource Management Policies**

**15 Hours**

- 1.1 Indian Bio-resources Information Network (IBIN); Convention on Biological Diversity (CBD); In-situ and Ex-situ Conservation methods.
- 1.2 Environmental impact Assessment: Concept, salient features and general process; Environmental Management Plan (EMP).
- 1.3 Environmental Ethics; Sustainable Development: its genesis and problems of implementation; Classification of wasteland and wasteland Reclamation.
- 1.4 Forest Conservation Act 1981; Wildlife Protection Act 1972; Biomedical Waste (Management and Handling) Rules, 1998.

## **REFERENCES:**

### **Essential Readings: -**

1. Ameenah Gurib-Fakim., (2014). Novel Plant Bioresources: Applications in Food, Medicine and Cosmetics. Wiley-Blackwell.
2. Deswal, S and Deswal, A. (2015). A basic course in Environmental Studies. Dhanpat Rai & Co.
3. Helfman, G., Collett, U. B. & Facey, U. E., (2011). The Diversity of Fishes: Biology, Evolution and Ecology, 2nd ed., Wiley-Blackwell.
4. Hickman, C. P., & Roberts, L. S., (2011). Animal Diversity, 6 th ed., McGraw-Hill Education.
5. Pandey, A., (2004). "Concise Encyclopaedia of Bioresource Technology", CRC Press.
6. Shukla G.S. and Upadhyay. (2001). Economic Zoology, 4 th Edition, Rastogi Publications, Meerut.
7. Timothy R. Tomlinson, Olayiwola Akerele., (1998). Medicinal Plants: Their Role in Health and Biodiversity. University of Pennsylvania Press.
8. Tripathi, G.,(2002). "Bioresource Technology", CBS Publications.

### **Suggested Readings: -**

1. Venkataraman, K., & Sivaperuman, C., (2014). Marine Faunal Diversity in India: Taxonomy, Ecology and Conservation. Academic Press.
2. Krishnamurthy, K.V., (2003). Textbook of Biodiversity, Science Publications.
3. Primack, R., (2006). Essentials of Conservation Biology, Sinauer associates, Inc., USA.
4. King, A., Cleveland, H and Streatfield, G., (1980). Bioresources for Development: The renewable way of life, Pergamon Press.
5. Anjaneyulu, Y. (2002). Environmental Impact Assessment Methodologies. BSP BS Publications, Hyderabad.
6. Singh, J. S; Singh, S. P and Gupta S. R. (2017). Ecology Environmental Science and Conservation. S. Chand.
7. Henry, J. G and Heinke, G. W. (2016). Environmental Science and Engineering. Pearson.
8. Prasad, G. (2012). Conservation of Natural Resources. Discovery Publishing House Pvt. Ltd.
9. Entrepreneurship: New Venture Creation, David H. Holt.
10. Entrepreneurship and Small Business Management: C.B. Gupta, S.S. Khanka, Sultan Chand & Sons.
11. Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
12. Vayas, S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic Farming Akta Prakashan, Nadiad
13. N.S. Gopalakrishnan & T.G. Agitha, (2009) Principles of Intellectual Property. Eastern Book Company, Lucknow.
14. Entrepreneurial Development by S.S. Khanka (S.Chand).
15. Watal J. 2001. Intellectual property rights in the WTO and developing countries. Oxford University Press. Oxford.