



OFFICE OF THE REGISTRAR:: DIBRUGARH UNIVERSITY:DIBRUGARH

Ref. No: DU/DR-A/6-1/20/74

Date: 20.01.2020.

NOTIFICATION

As recommended by the Board of Studies in Life Sciences, the Hon'ble Vice Chancellor, Dibrugarh University is pleased to approve the Syllabus of the 2 Credit Ability Enhancement Compulsory Course on Environmental Studies (Course Code: EVS CBCS) prescribed for all Under Graduate Degree Programmes in the Choice Based Credit System under report to the Under Graduate Board and Academic Council, Dibrugarh University. The Syllabus shall come into effect from the academic session 2019-2020. The Syllabus is enclosed with this Notification as Annexure A.

Issued with due approval.

Sd/- Dr. B.C. Borah
Joint Registrar (Academic)
Dibrugarh University

Copy to:

1. The Vice-Chancellor, Dibrugarh University for favour of information.
2. The Deans, Dibrugarh University.
3. The Registrar, Dibrugarh University for favour of information.
4. The Controller of Examinations, Dibrugarh University for favour of information and the needful.
5. The Director, Directorate of Open and Distance Learning, Dibrugarh University.
6. The Director, College Development Council, Dibrugarh University for favour of information.
7. The Principals/ Registrars/ Directors of the Colleges/ Departments/ Centres/ Institutes conducting the Under Graduate Degree Programmes in CBCS for favour of information and the needful. They are requested to download the syllabus from the website www.dibru.ac.in.
8. The Joint/ Deputy Controller of Examinations (A, B & C), Dibrugarh University for favour of information and needful. A copy of the Syllabus is enclosed herewith.
9. The Programmer, Dibrugarh University for information and the needful.
10. File.

Sd/-Dr. B.C. Borah
Joint Registrar (Academic)
Dibrugarh University.



**DIBRUGARH UNIVERSITY SYLLABUS FOR ENVIRONMENTAL STUDIES
FOR ALL UNDER GRADUATE DEGREE PROGRAMMES
IN CBCS**

Type of the Course: Ability Enhancement Compulsory Course (AECC)

Course Code: EVS CBCS

Total Marks: 100

Total Classes: 64

Total Credit: 2

Unit 1 : The Multidisciplinary nature of environmental studies

Classes : 4

Marks : 5

Definition, scope and importance

Need for public awareness.

Unit 2 : Natural Resources :

Classes : 10

Marks : 20

Renewable and non-renewable resources:

- Natural resources and associated problems.
 - a) Forest Resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.
 - b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, and salinity.
 - e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
 - f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems

Classes : 10

Marks : 17

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.

- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristics features, structure and function of the following ecosystem:
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4: Biodiversity and its conservation

Classes : 10
Marks : 16

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographically classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Hot-spots of biodiversity – India.
- Threats to biodiversity: habits loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species.
- Conservation of biodiversity: in-situ Ex-situ conservation of biodiversity.

Unit 5: Environmental Pollution

Classes : 10
Marks : 17

- Definition, Causes, effects and control measures of :
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Noise pollution
 - e. Thermal pollution
 - f. Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes – biodegradable and non biodegradable wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: Floods, earthquake, cyclone and landslides.

Unit 6: Social Issues and the Environment

Classes : 10
Marks : 15

- From Unsustainable to Sustainable development.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics.
- Climate change, global warming, acid rain, ozone layer depletion, unclear accidents and holocaust.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental Legislation.
- Public awareness.

Unit 7: Human Population and the Environment

Classes : 10

Marks : 10

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health and hygiene (including Sanitation and HIV/AIDS) etc.
- Role of Information Technology in Environment and Human Health.

REFERENCES

1. Rajagopalan, R. 2018 Environmental Studies- From Crisis To Cure, Oxford University Press, New Delhi.
2. Agarwal, K.C. 2001 Environmental Biology, Nidi publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmadabad – 380 013, India Email: Mapin@icenet.net (R)
4. Bharucha Erach, Text book on Environmental Studies, UGC, New Delhi
5. Borua P.K., J.N.Sarma and others, A Text book on Environmental Studies, Banlata, Dibrugarh
6. Brunner R.C., 1989 Hazardous Waste Incineration, McGraw Hill Inc. 480p.
7. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
8. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jacio Publ. House, Mumbai, 1196p.
9. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
10. Down to Earth, Centre for Science and Environment (R).
11. Dutta Prasanna, Rofique Ahmed & Sumbit Chaliha, Environmental Studies., Eunika Publication, Jorhat
12. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute. Oxford Univ. Press 473p.
13. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
14. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
15. Jadav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
16. Joshi P.C. and Namita Joshi, A Text book of Ecology and Environment, Himalaya Publishing
17. Kaushik Anubha and C.P.Kaushik .Perspective in Environmental Studies, New Age International
18. McKinney, M.L. & Schooh, R.M. 1996. Environmental Science systems & Solution, Web enhance/edition. 639p.
19. Mhaskar A.K. Matter Hazardous, Techono-Science Publications (TB).
20. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB).
21. Odum, E.P. 1911 Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
22. Rao M.N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
23. Sharma B.K., 2001. Environmental Chemistry. Goel Publ. House, Meerut.
24. Survey of the Environment, the Hindu (M).
25. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science (TB).
26. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R).
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
28. Wagner K.D., 1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p.
(M) Magazine (R) Reference (TB) Textbook

BOTANY

CBCS Undergraduate Programme, 2018 : Botany Honours (Last updated: 08-04- 2019)

Course Code: BC409P

Core Course IX - Practical: Plant Ecology and Phytogeography

1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.
2. Determination of pH of various soil and water samples (pH meter, universal indicator/Lovibond comparator and pH paper)
3. Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests.
4. Determination of organic matter of different soil samples by Walkley & Black rapid titration method.
5. Comparison of bulk density, porosity and rate of infiltration of water in soils of three habitats.
6. Determination of dissolved oxygen of water samples from polluted and unpolluted sources.
7. (a). Study of morphological adaptations of hydrophytes and xerophytes (four each).
(b). Study of biotic interactions of the following: Stem parasite (*Cuscuta*), Root parasite (*Orobanch*) Epiphytes, Predation (Insectivorous plants).
8. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus, by species area curve method (species to be listed).
9. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law.
10. Quantitative analysis of herbaceous vegetation for density and abundance in the college campus.
11. Field visit to familiarise students with ecology of different sites.

Suggested Readings

1. Odum, E.P. (2005). Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition.
2. Singh, J.S., Singh, S.P., Gupta, S. (2006). Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi, India.
3. Sharma, P.D. (2010). Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
4. Wilkinson, D.M. (2007). Fundamental Processes in Ecology: An Earth Systems Approach. Oxford University Press. U.S.A.
5. Kormondy, E.J. (1996). Concepts of ecology. PHI Learning Pvt. Ltd., Delhi, India. 4th edition.

BOTANY

CBCS Undergraduate Programme, 2018 : Botany Honours (Last updated: 08-04- 2019)

Course Code: BC409T

Core Course IX: Plant Ecology and Phytogeography

The objective of this course is to expose the students to interaction of plant with its surroundings and also the geographic distribution of different plants

(Credits: Theory-4, Practical-2)

THEORY

Lectures: 60

Unit 1: Introduction

(4 lectures)

Basic concepts; Levels of organization. Inter-relationships between the living world and the environment, the components and dynamism, homeostasis.

(15 lectures)

Unit 2: Soil : Importance, Origin, Formation, Composition, Physical, Chemical and Biological components, Soil profile, Role of climate in soil development; **Water:** Importance, States of water in the environment, Atmospheric moisture, Precipitation types (rain, fog, snow, hail, dew); Hydrological Cycle, Water in soil, Water table. **Light, temperature, wind and fire** Variations, adaptations of plants to their variation.

Unit 3: Biotic interactions:

(5 lectures)

Trophic organization, basic source of energy, autotrophy, heterotrophy; symbiosis, commensalism, parasitism;

Unit 4: Population ecology:

(6 lectures)

Characteristics and Dynamics .Ecological Speciation

Unit 5: Plant communities

(6 lectures)

Concept of ecological amplitude; habitat and niche; Characters: analytical and synthetic; Ecotone and edge effect; Dynamics: succession – processes, types; climax concepts.

Unit 6: Ecosystems: Structure and Function

(12 lectures)

Ecological pyramids. Principles and models of energy flow; Production and productivity; Ecological Biogeochemical cycles; Cycling of Carbon, Nitrogen and Phosphorus.

Unit 7: Phytogeography

(12 lectures)

Principles; static and dynamic phytogeography, Continental drift; Theory of tolerance; Endemism; Brief description of major terrestrial biomes (one each from tropical, temperate & tundra); Phytogeographical regions of India; Local Vegetation.

CHEMISTRY

CBCS: B. Sc. (Honours) with CHEMISTRY
Discipline Specific Elective (DSE) Course

CHEMISTRY
(Honours)
(5th Semester)

Course No.: **CHEMISTRY-DSE-502**

(Green Chemistry)

Contact Hours: 60

Full Marks = 70 [End Semester Exam (56) Internal Assessment (14)]

Objective of the Course: To develop the basis knowledge of green chemistry and its future trends.

Expected Learner Outcome: Students will gain an understanding of

- i. concept of green chemistry
- ii. Use of safer chemicals
- iii. Concept of atom economy
- iv. Use of green solvent
- v. Use of green chemistry in our day to day life

Unit I: Introduction to Green Chemistry

What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations? Obstacles in the pursuit of the goals of Green Chemistry.

4 Lectures, Marks - 4

Unit II: Principles of Green Chemistry and Designing a Chemical synthesis

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following

- i) Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products, Atom Economy, Calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- ii) Prevention/ minimization of hazardous/ toxic products reducing toxicity
- iii) Green solvents- supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents.
- iv) Energy requirements for reactions- alternative sources of energy: use of microwaves and ultrasonic energy.
- v) Selection of starting materials; avoidance of unnecessary derivatization- careful use of blocking/ protecting groups.
- vi) Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis.


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CHEMISTRY

vii) Prevention of chemical accidents designing greener processes, inherent safer design, principle of ISD “What you don’t have cannot harm you”, greener alternative to Bhopal Gas Tragedy (safer route to carcarbaryl) and Flixiborough accident (safer route to cyclohexanol) subdivision of ISD, minimization, simplification, substitution, moderation and limitation.
viii) Strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes.

30 Lectures, Marks - 27

Unit III: Examples of Green Synthesis/ Reactions and some real world cases

Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis)

Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents, Diels-Alder reaction and Decarboxylation.

Ultrasound assisted reactions: sonochemical Simmons- Smith Reaction (Ultrasonic alternative to Iodine)

Surfactants for carbon dioxide- replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning garments.

Designing of Environmentally safe marine antifoulant.

Rightfit pigments: synthetic azopigments to replace toxic organic and inorganic pigments.

An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.

Healthier Fats and Oil by Green Chemistry: Enzymatic Inter esterification for production of no Trans-Fats and Oils.

Development of Fully Recyclable Carpet: Cradle to Cradle Carpeting.

16 Lectures, Marks - 15

Unit IV: Future Trends in Green Chemistry:

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis (C²S³); Green chemistry in sustainable development.

10 Lectures, Marks - 10

Reference Books:

1. V. K. Ahluwalia & M. R. Kidwai: New Trends in Green Chemistry, Anamalaya Publishers (2005).
2. P. T. Anastas & J. K. Warner: Oxford Green Theory and Practical, University Press (1998).
3. A. S. Matlack: Introduction to Green Chemistry, Marcel Dekker (2001).
4. M. C. Cann & M. E. Connely: Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).
5. M. A. Ryan & M. Timmesand, Introduction to Green Chemistry, American Chemical Society, Washington (2002).

CHEMISTRY

CBCS: B. Sc. (Honours) with CHEMISTRY
Discipline Specific Elective (DSE) Course

CHEMISTRY
(Honours)

(6th Semester)

Course No.: **CHEMISTRY-DSE-602**

(Industrial Chemicals and Environment)

Contact Hours: 60

Full Marks = 70 [End Semester Exam (56) Internal Assessment (14)]

Objective of the Course: To impart knowledge about nuclear pollution, ecosystem, handling of industrial gases, semi conductor technology etc.

Expected Learner Outcome: Students will gain an understanding of

- Stored and handle different types of industrial gases and chemicals
- Semiconductor technology
- The effect of hazardous chemicals, purification method of water and industrial waste management.

Unit I: Industrial Gases and Inorganic Chemicals

Industrial Gases: Large scale production, uses, storage and hazards in handling of the following gases: Oxygen, nitrogen, argon, neon, helium, hydrogen, acetylene, carbon monoxide, chlorine, fluorine, sulphur dioxide and phosgene.

Inorganic materials: Manufacture, application, analysis, and hazards in handling of the following chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, common salt, borax, bleaching powder, sodium thiosulphate, hydrogen peroxide, potash alum, chrome alum, potassium dichromate and potassium permanganate.

10 Lectures, Marks - 10

Unit II: Industrial Metallurgy

Preparation of metals (ferrous and non ferrous) and ultrapure metals for semiconductor technology.

4 Lectures, Marks - 4

Unit III: Environment and its segments

Ecosystem, Biogeochemical cycles of carbon, nitrogen and sulphur.

Air Pollution: Major regions of atmosphere. Chemical and photochemical reactions in atmosphere. Air pollutants: types, sources, particle size and chemical nature. Photochemical smog: its constituents and photochemistry. Environmental effects of ozone, major sources of air pollution.

Pollution by SO₂, CO₂, CO, NO_x, H₂S and other foul smelling gases, Methods of estimation of CO, NO_x, SO_x and control procedures.


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CHEMISTRY

Effects of air pollution on living organisms and vegetation. Greenhouse effect and Global warming, Ozone

Lection by oxides of nitrogen, chlorofluorocarbons and halogens, removal of sulphur from coal. Control of particulates.

Water pollution: Hydrological cycle, water resources, aquatic ecosystems, Sources and nature of water pollutants, Techniques for measuring water pollution, Impacts of water pollution on hydrological and ecosystems.

Water purification methods. Effluent treatment plants (primary, secondary and tertiary treatment). Industrial effluents from the following industries and their treatment: electroplating, textile. Tannery, diary, petroleum and petrochemicals, agro, fertilizers etc. Sludge disposal.

Industrial waste management, incineration of waste. Water treatment and purification (Reverse osmosis, electro dialysis, ion-exchange). Water quality parameters for waste watter, industrial water and domestic water.

30 Lectures, Marks - 30

Unit IV: Energy & Environment

Sources of energy: Coal, petrol and natural gas. Nuclear Fusion/ Fission, Solar energy, Hydrogen, Geothermal, Tidal and Hydel etc.

Nuclear pollution: Disposal of nuclear waste, nuclear disaster and its management.

10 Lectures, Marks - 8

Unit V: Biocataysis

Introduction to biocatalysis: Importance in “ Green Chemistry” and “ Chemical Industry”

6 Lectures, Marks - 4

Reference Books:

1. E. Stocchi: *Industrial Chemistry*, Vol-1, Ellis Horwood Ltd, UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi
3. J. A. Kent: *Riegel's Handbook of Industrial Chemistry*, CBS Publishers, New Delhi
4. S.S.Dara: *A Textbook of Engineering Chemistry*, S. Chand & Company Ltd, New Delhi
5. K.De, *Environmental Chemistry*: New Age International Pvt. Ltd., New Delhi
6. S. M. Khopkar, *Environmental Pollution Analysis*: Wiley Eastern Ltd, New Delhi
7. S.E. Manahan, *Environmental Chemistry*, CRC Press (2005)
8. G. T. Miller, *Environmental Science*, 11th Ed. Brooks/ Cole(2006)
9. A. Mishra, *Environmental Studies*. Selective and Scientific Books, New Delhi (2005)

ECONOMICS

Course Code: ECNHDSE602

Nature of the Course: Discipline Specific Elective

Full marks: 100 (Internal Assessment-20 + End Term-80)

Course Title: Environmental Economics

Total Credit Assigned: 6

Distribution of Credit: 5 Lecture + 1 Tutorial

Course Description:

This course aims to focus on economic causes of environmental problems; in particular, how economic principles are applied to environmental questions and their management through various economic institutions, economic incentives and other instruments and policies. It also aims to address Economic implications of environmental policy as well as valuation of environmental quality, quantification of environmental damages, tools for evaluation of environmental projects such as cost-benefit analysis and environmental impact assessments.

Units	No of Lecture Hours	No of Tutorial Hours	Marks
1. Introduction: Basic Concepts: Ecology, Environment and Economy; what is environmental economics: Definition and evolution of the subject; Environmental economics and Resource economics; The economy and the environment: Inter-linkages; Environment and Development trade off: Environmental Kuznet curve; Review of microeconomics and welfare economics: Pareto optimality, Public good and Private good, Common property resources, Private and Social cost, Public Good and Bad	15	3	16
2. The Theory of Externalities: Externality: Meaning and types; Pareto optimality and market failure in the presence of externalities; solution to market failure: property rights and the Coase theorem.	15	3	16
3. The Design and Implementation of Environmental Policy and Sustainable Development: Environmental Policies: Overview; Economic instruments of environmental policies: Pigouvian taxes and effluent fees, tradable permits, liability rules. Sustainable Development: Concept; Notions of Sustainability: Strong and Weak sustainability, Measurement and indicators of sustainability: The Pearce–Atkinson indicator.	15	3	16
4. International Environmental Problems: Trans-boundary environmental problems as problems of international externalities: Global warming, Ozone layer depletion; economics of climate change; trade and environment; Pollution Haven Hypothesis; Global intervention for sustainable development	15	3	16
5. Measuring the Benefits of Environmental Improvements: Non-Market values: Types and definitions of non-market values; measurement or valuation methods: Contingent valuation and Travel cost methods; their comparative advantages and disadvantages	15	3	16
Total	75	15	80


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ECONOMICS

Recommended Readings:

- Bhattacharyya R, *Environmental Economics*, Oxford University Press
- Cropper, M.L., and Oates, W.E, 1992, —Environmental Economics: A Survey *Journal of Economic Literature*, Volume 30:675-740.
- Hanley, N., Shogren, J.F. and White, B., *Environmental Economics in Theory and Practice*, Macmillan India Ltd.
- Kolstad, C., *Intermediate Environmental Economics*, Oxford University Press, 2nd edition, 2010.
- Perman R, Ma, Y., McGilvray, J. and Common, M., *Natural Resource and Environmental Economics*, Pearson Education/Addison Wesley, 3rd edition, 2003.
- Stavins, R.N., (ed.), *Economics of the Environment: Selected Readings*, W.W. Norton, 5th edition, 2005.

HISTORY

Dept. of History

In- Semester Marks : 20
End- Semester Marks : 80
Total Marks : 100
10 to 12 classes per unit

Semester: VI

Course: XI

HISTORY OF ECOLOGY AND ENVIRONMENT IN INDIA

Objective:

This course intends to acquaint the students with the new discipline of ecological and environmental history. It intends to familiarize them with the relation between ecology and human civilization with particular reference to post independence India. It also attempts to bring the pupils to the understanding of the social and economic conflicts emerging due to environmental factors.

Unit I:

Marks: 16

- 1.01 : Emergence of Environmental History as a branch of History
- 1.02 : Geographical Background of the Indian Subcontinent : Physical division, flora and fauna.
- 1.03 : Mode of Resource Utilization : Gathering, Nomadic, Pastoralism, Agricultural Mode and Industrial Mode

Unit II:

Marks: 16

- 2.01 : Ecological mapping of Indus Valley Civilization and its decline: the Environmental factors
- 2.02 : Use of iron implements; Agricultural Expansion and Deforestation in the Gangetic Valley.
- 2.03 : Forest and the pastoral communities in the Medieval period.

Unit III:

Marks: 16

- 3.01 : Making of British Forest Policy in India : Forest Acts of 1878 and 1927
- 3.02 : Impact of British Forest Policy : Deforestation and Ecological change in India.
- 3.03 : Commercial Exploitation of Forest Products; Impact of Railway Construction on Forestry during the colonial period.

Unit IV:

Marks: 16

- 4.01 : Conservation Policies in Post independence Period; Social Forestry
- 4.02 : Environmental movements : Chipko Movement, Narmada Bachao Andolan.
- 4.03 : Dams and Mines: Problems of displacement, Loss of Livelihood and Problems of Rehabilitation

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ZOOLOGY

CBCS Undergraduate Program, 2018: Zoology Honours (Last updated on 08-04-2019)

GE IV: ENVIRONMENT AND PUBLIC HEALTH

THEORY

(Credits 4)
(Lectures=60)

UNIT I: Introduction

12 Lectures

Sources of Environmental hazards, hazard identification and accounting, fate of toxic and persistent substances in the environment, dose Response Evaluation, exposure Assessment.

UNIT II Climate Change

10 Lectures

Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health

Unit III Pollution

10 Lectures

Air, water, noise pollution sources and effects, Pollution control

Unit IV Waste Management Technologies

18 Lectures

Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste disposal, Biomedical waste handling and disposal, Nuclear waste handling and disposal, Waste from thermal power plants, Case histories on Bhopal gas tragedy, Chernobyl disaster, Seveso disaster and Three Mile Island accident and their aftermath.

Unit 5 Diseases

10 Lectures

Causes, symptoms and control of tuberculosis, Asthma, Cholera, Minamata disease, typhoid

ZOOLOGY

CBCS Undergraduate Program, 2018: Zoology Honours (Last updated on 08-04-2019)

GE IV: ENVIRONMENT AND PUBLIC HEALTH

PRACTICAL

(Credits 2)

1. To determine pH, Cl, SO₄, NO₃ in soil and water samples from different locations.

SUGGESTED BOOKS

- 1 Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
- Kolluru Rao, Bartell Steven, Pitblado R and Stricoff –Risk Assessment and Management Handbook, McGraw Hill Inc., New York, 1996.
- Kofi Asante Duah –Risk Assessment in Environmental management, John Wiley and sons, Singapore, 1998.
- Kasperson, J.X. and Kasperson, R.E. and Kasperson, R.E., Global Environmental Risks, V.N. University Press, New York, 2003.
- Joseph F Louvar and B Diane Louver Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey 1997.