

तार : विश्वविद्यालय
Gram : UNIVERSITY



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बुन्देलखण्ड विश्वविद्यालय, झाँसी BUNDELKHAND UNIVERSITY, JHANSI

झाँसी (उ.प्र.) 284128

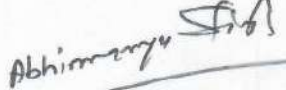
संदर्भ...BU/Env.Sc/2022-1058

दिनांक...2/12/2022

The Minutes of Meeting of BOS

In reference to the BOS of department of Environmental
Science....., Institute of Environment and
Development Studies..... held on 14/6/2022 regarding the
revision of syllabus in tune with CBCS/NEP-2020 and subsequent
approval from Academic Council. This is to certify that the syllabus is
100% revised.


Registrar
Bundelkhand University
JHANSI


For HOD/Coordinator
Dr. Adhimanjya Singh
Co-ordinator
Institute of Environmental Sciences
Bundelkhand University, Jhansi (U.P.)

INSTITUTE OF ENVIRONMENT AND DEVELOPMENT STUDIES
BUNDELKHAND UNIVERSITY, JHANSI

Minutes of Board of Studies Meeting for the session 2021 – 22

According to the letter no. BU/Acad./2022/6310-6350 dt. 09.06.2022, the Board of Studies meeting of Institute of Environment and Development Studies, B.U. Jhansi was held on 14.06.2022 regarding the modification and upgradation of syllabus of the courses B.Sc. (Hons.) Environmental Science, M.Sc. Environmental Science and Post Graduation Diploma in Environmental Management (PGDEM) in the meeting hall of VC Committee room. In this meeting following members were present:

1. Dr. Vinit Kumar, *Convener, BoS, IE DS*
2. Dr. Smriti Tripathi, *Coordinator, IE DS*
3. Dr. A.K. Giri, *Member*
4. Dr. Abhimanyu Singh, *Member*
5. Dr. Amit Pal, *Member*
6. Dr. Sandeep Arya, *Member*
7. Prof. R.P. Singh, *External Expert*
8. Dr. Sanjay Singh, *External Expert*
9. Prof. N.C. Gautam, *External Expert*
10. Prof. Kusum Arunachalam, *External Expert*

In this meeting held on 14.06.2022 the upgradation and minor syllabus revision of B.Sc. (Hons.) Environmental Science, M.Sc. Environmental Science and Post Graduation Diploma in Environmental Management (PGDEM) was discussed and implemented. The expert panel list for examination of the session 2022 -23 was also finalized in this meeting. Implementation of New Education Policy (NEP) at (UG and PG) level for the academic session 2022 – 23 is also accepted in this BoS meeting.



Co-ordinator
Institute of Environment & Development Studies
Bundelkhand University, JHANSI (U.P.)

Dr. Smriti Tripathi
Coordinator, IE DS
BU, Jhansi

**Institute of Environment and Development Studies
Bundelkhand University, Jhansi**

Syllabus B.Sc. (Hons.) Environmental Sciences

Year	Semester	Subject Code	Subject Title	Credits	Marks		
					Int.	Ext.	Total
CERTIFICATE IN FUNDAMENTALS OF ENVIRONMENTAL SCIENCES							
FIRST YEAR	I	DSC - 1	Fundamentals of Environmental Science	4	25	75	100
		DSC - 2	Environmental Biology	4	25	75	100
		P - I	Practical I (Practical DSC 1 + Practical DSC II)	4	50	150	200
		DSE- 1	Student has to choose from ordinance table 3.	4	25	75	100
		P - II	Practical II	2	25	75	100
		GE - I	Student has to choose from ordinance table 4.	4	25	75	100
		SEC - I	Student has to choose from ordinance table 5.	3	25	75	100
		VAC - I	Food and Nutrition (as per ordinance Table 6).	VAC			
				25			800
	II	DSC - 3	Environmental Chemistry	4	25	75	100
		DSC - 4	Environmental Pollution and Management	4	25	75	100
		P - III	Practical I (Practical DSC 3 + Practical DSC 4)	4	50	150	200
		DSE- 2	Student has to choose from ordinance table 3.	4	25	75	100
		P - IV	Practical II	2	25	75	100
		SEC - II	Student has to choose from ordinance table 5.	3	25	75	100
VAC - II		First Aid and Health (as per ordinance Table 6).	VAC				
				21			700
DIPLOMA IN ENVIRONMENTAL SCIENCES							
SECOND YEAR	III	DSC - 5	Biodiversity and its Conservation	4	25	75	100
		DSC - 6	Natural Resource and its Management	4	25	75	100
		P - V	Practical I (Practical DSC 5 + Practical DSC 6)	4	50	150	200
		DSE- 2	Student has to choose from ordinance table 3.	4	25	75	100
		P - VI	Practical II	2	25	75	100
		GE - II	Student has to choose from ordinance table 4.	4	25	75	100
		SEC - III	Student has to choose from ordinance table 5.	3	25	75	100
		VAC - III	Human Values and	VAC			

			Environmental Studies (as per ordinance Table 6).					
				25			800	
	4 th semester	DSC – 7	Environmental Legislation and impact Assessment	4	25	75	100	
		DSC – 8	Solid and Hazardous waste Management	4	25	75	100	
		P – VI	Practical I (Practical DSC 7 + Practical DSC 8)	4	50	150	200	
		DSE– 2	Student has to choose from ordinance table 3.	4	25	75	100	
		P – VII	Practical II	2	25	75	100	
		SEC – III	Student has to choose from ordinance table 5.	3	25	75	100	
		VAC – IV	Physical Education and Yoga (as per ordinance Table 6).	VAC				
				21			700	
DEGREE IN BACHLOR OF SCIENCE								
THIRD YEAR	5 th Semester	DSC – 9	Environmental Microbiology and Biotechnology	4	25	75	100	
		DSC – 10	Advances In Noise Pollution Abatement Techniques	4	25	75	100	
		DSC – 11	Energy management and Development	4	25	75	100	
		P – VIII	Practical I ((Practical DSC 9 + Practical DSC 10 + Practical DSC 11)	6	75	225	300	
		VAC – V	Analytic Ability and Digital Awareness (as per ordinance Table 6).	VAC				
					18			600
	6 th Semester	DSC – 12	Environmental Priorities and Research Tools	4	25	75	100	
		DSC – 13	Global climate change	4	25	75	100	
		DSC – 14	Green Management	4	25	75	100	
		P – XVI	Practical I ((Practical DSC 12 + Practical DSC 13 + Practical DSC 14)	6	75	225	300	
			Industrial Training	4		100	100	
VAC – VI		Communication skills and personality development or character building (as per ordinance Table 6).	VAC					
				22			600	
			Total	132			4200	

Program Educational Objectives (PEOs)

The **M. Sc. Environmental Sciences** program describe accomplishments that graduates are expected to attain within five to seven years after graduation

PEO1	The students could get employment opportunities in Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB), Research Institutions, Colleges, Universities and Non-governmental organizations.
PEO2	After successful completion of the course, the students could get job opportunities in urban and rural environmental mitigation and awareness including social forestry programs, bio-fertilizer and bio-pesticide industries, waste management and organic farming divisions funded by National, International and Regional agencies.
PEO3	The students could get employment perspectives in R & D laboratories of waste water treatment plants, metal, chemical and textile effluent treatment plants, municipal solid waste management units and waste management in biomedical industries and hospitals.
PEO4	The students could find employment opportunities in agro industries, forest departments, water harvesting and watershed management sectors, bio-resource utilization and biodiversity conservation organizations, food and feed Industries, environment friendly and integrated livestock management sectors.
PEO5	Students also having the immense opportunities to pursue higher studies in various research fields such as environmental pollution, environmental chemistry, waste management and bioremediation, environmental microbiology, waste water treatment, recycle, reuse and management, sustainable environmental food security, bio-resource utilization and biodiversity conservation, functional and ecosystem ecology, environmental toxicology, agro-waste ecosystem, non-biodegradable synthetic chemicals and polymers in environment, occupational health and industrial safety, environment analytical techniques, environmental impact assessment, remote sensing and geographical information system, environmental biotechnology, carbon sequestration, natural disaster management and mitigation, climate change, marine pollution and resources utilization, restoration of different ecosystems, renewable and green energy and environmental law, policies and auditing.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
CERTIFICATE IN FUNDAMENTALS OF ENVIRONMENTAL SCIENCES	
FIRST YEAR	<p>The aim is to build conceptual understanding of students by exposing them to the basic principles behind various environmental processes.</p> <p>To introduce students to the basic concepts of ecology its different branches, scope and ecosystem dynamics along with the various ecosystem functions. They also be able to understand the good laboratory practices, meteorological parameters and to know the strategies for sustainable management and carrying capacity. Educate the students on source, classification, and impact of air, water and soil pollution. The students will also recognize the various control measures of pollution problems. Understand the solid waste pollution, noise pollution, radioactive and thermal pollution and related consequences</p>
DIPLOMA IN ENVIRONMENTAL SCIENCES	
SECOND YEAR	<p>To enrich the knowledge on biodiversity its value and various approach for conservations. Make students aware of biodiversity of India, biogeographic zones and role of local communities and traditional knowledge in conservation.</p> <p>To develop the understanding on natural resources and their significance and to know the strategies for sustainable management. Understand the basic principles and application of remote sensing and GIS techniques.</p> <p>Understand the basic laws, act, treaty, public policies and PIL. Environment provisions in constitution, power and functions of government agencies for pollution control. In addition also get the knowledge of sustainable management of wastes.</p> <p>The objective of the course is to provide a comprehensive and historical overview of hazardous waste management, drawing from both scientific and engineering principles, and prepare our students to be well-qualified and competitive in the responsibility of engineering design and permitting in the field of hazardous waste management.</p>
DEGREE IN BACHELOR OF SCIENCE	
THIRD YEAR	<p>Impart knowledge on microbial diversity and recent advancement methods in the analysis of microbial diversity. Provide in-depth knowledge of role of beneficial and pathogenic microorganisms in environment.</p> <p>Understand the application of microbes for production of different eco-friendly products. Impart knowledge in molecular biotechnology and its applications in Environmental management and conservation. Make students aware about Bioethics, biosafety and IPR.</p> <p>To introduce students to the general environmental awareness, current environmental priorities in India and basic of statistics and instrumentations.</p>

Programme/Class: Certificate		Year: First	Semester: First
Theory		Subject: Environmental Sciences	
Course Code: DSC – 1		Course Title: Fundamentals of Environmental Sciences	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Learn fundamental concept of environmental science • Develop understanding about environmental education, justice and environmentalism. • Gain knowledge about origin of life and related theories. • Able to understand the relationship between man and environment. • Understand the structure and composition of different sphere of earth. • Also able to understand the different meteorological parameters. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Concept of Environment: Bhartiya Gyan Parampara aur bhartiya Vaigyanik; Definition, Principles and Scope of Environmental Science; Moral and Aesthetic Nature of Environmental Science; Objectives and Historic roots of the subject; Need for Public Awareness.		14
II	Environmental Education: Goals of environmental education; Environmental Literacy, Environmental Careers, Environmental Justice, Individual Organisms, Environmentalism, Environmental Education at Primary, Secondary level.		12
III	Evolution: Origin of life and speciation, Darwinism and modern synthetic theory of evolution, Natural Selection; Biochemical basis of origin of life; Hardy Weinberg Equilibrium; genetic drift.		10
IV	Man and Environment: Man-Environment relationships; Impacts of human activity on environment (Agriculture, transportation, mining, urbanization, industrialization); Environmental Degradation and Conservation Issues, Modern concept of environmental conservation, Sustainability and Carrying Capacity.		14
V	Meteorology: Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere; Meteorological Parameters- Pressure, Temperature, Precipitation, Humidity, Wind Speed and Direction, Wind Rose, Inversion.		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Environmental Studies by Benny Joseph, McGraw Hill Education; Third edition, 2017. 2. Fundamentals of Environmental Studies by MahuaBasu and Xavier Savarimuthu SJ, Cambridge publications, 2017. 3. Environmental Science: Toward a Sustainable Future, Richard T. Wright, Dorothy F. Boorse, Pearson Publications, 12th Edition, 2015. 4. Environmental Science by S. C. Santra, New Central Book Agency; 3rd edition, 2011. 			

Programme/Class: Certificate		Year: First	Semester: First
Theory		Subject: Environmental Sciences	
Course Code: DSC – 2		Course Title: Environmental Biology	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Learn basic elements of ecology and environmental factors. • Developing understanding about ecosystem dynamics. • Understand the different functions played by ecosystem. • Learn the positive and negative interaction of the organism. • Develop conceptual skills about biogeochemical cycles. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Ecology: Introduction of Ecology (Definition, History, Branches and Scope). Basic principles of Environment and Ecology; Environmental factors (Abiotic and biotic) their importance and role.		10
II	Ecosystem: Components, structure and function of ecosystem; Major ecosystems (terrestrial, aquatic, and marine); Trophic Levels, food chain and food webs; Energy flow in Ecological systems; Ecological Pyramids, Productivity.		10
III	Autecology: Population Characteristics- Dispersion, Density, Natality, Mortality, Age-Structure, Population Growth; Human population & growth; Ecological niche and habitat; Positive and Negative Interactions of Populations.		14
IV	Synecology: Community Structure, Growth Forms; Methods of Plant Community Analysis; Concept of Keystone Species, Ecotone, Ecotypes, Ecophene, ecological indicators; Ecological Succession.		12
V	Biogeochemical Cycles: Hydrological, Gaseous and Sedimentary Cycle- Carbon, Oxygen, Nitrogen, Phosphorus and Sulphur Cycles; Major biome of the world.		14
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. A Textbook of Plant Ecology, By R. S. Ambusht 15th Edition, CBS Publications, 2017. 2. Fundamentals of Ecology by E. Odum and G. Barrett, Brooks/Cole; 5th edition, 2004. 3. The Ecology of Nature by Robert Ricklefs, Fifth Edition. W.H. Freeman and Company, 2001. 4. Tropical Ecosystems: Ecology and Management by Singh K.P. and J.S. Singh (1992). Wiley Eastern Limited, Lucknow, India 			

Programme/Class: Certificate	Year: First	Semester: First
Practical	Subject: Environmental Sciences	
Course Code: P – I	Course Title: Practical DSC – 1 + DSC 2	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Understand the Good Laboratory Practices including Dos & DON'Ts in the laboratory. • Learn interaction of human with environment. • Develop understanding about local environmental problems and able to find remedy. • Gain knowledge about different meteorological parameters. • Survey skill of vegetation, insects and other animals. • Learn sampling techniques for water and soil samples. • Understand to set up an aquarium. • Practical skills for analyzing the quadrate study of grassland vegetation. 		
Credits: 2 + 2 =4	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
Lab Experiment List:		
<ol style="list-style-type: none"> 1. Good Lab Practices (GLP). <ol style="list-style-type: none"> i. Instructions ii. DOs and DON'Ts in the Laboratory iii. General Information iv. Introduction 2. Study of effects of human interaction with natural environment. 3. Describe the environmental problem of your locality and suggest a remedy. 4. Choose five common species of Trees / plants from your NEIGHBORHOOD and list their common names. Describe each plant in terms of its height and leaves. 5. To record the following parameters of weather monitoring station: <ol style="list-style-type: none"> A. Atmospheric Pressure B. Rainfall C. Outdoor, indoor temperature D. Wind speed and Direction E. Humidity & draw point. 6. To determine Texture of various soil samples. 1. To determine the following parameters of grassland vegetation: <ol style="list-style-type: none"> i. Minimum size and number of quadrate ii. Frequency, Density and abundance of plant species 		

Programme/Class: Certificate		Year: First	Semester: Second
Theory		Subject: Environmental Sciences	
Course Code: DSC – 3		Course Title: Environmental Chemistry	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Environmental Chemistry involves the study of chemicals and chemical processes • Learn basic chemical process within the air, water, and soil. • It also involves the study of the source, route, transformation and the effects of the chemicals on various ecosystems. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Basic concepts of chemistry : Atomic Structure, molecular weight, molarity, normality, valency, oxidation states, chemical bonds (ionic, covalent, coordinate and hydrogen bonds); concepts of pH, acids, bases and salts, solutes and solvents, saturated and unsaturated hydrocarbons; concept of xenobiotic compounds.		10
II	Atmospheric chemistry : Chemistry of troposphere and stratosphere; Chemistry of smog formation, Aerosols: PM 10, PM 2.5; chemistry of acid rain, sources of NOX and SOX, role of CFCs in ozone layer depletion.		12
III	Water chemistry : Fundamentals of water quality: Concept of DO, BOD, COD, hardness; Solubility of gases in water; Concept of acidimetry, alkalimetry, iodometry, gravimetry, conductimetry; Aquatic chemistry of Hg, Cd, Cr and As.		12
IV	Soil chemistry : Soil composition; Physicochemical properties of soils, Relation between organic carbon and organic matter, inorganic and organic components in soil; soil humus; nitrogen, phosphorus and potassium in soil.		12
V	Industrial Chemistry and Instrumental Techniques : Basic metallurgical operations (pulverization, calcinations, roasting, refining of Aluminium); Composition and uses of coal; Classification of and manufacture of cement; Principle and application of Atomic Absorption Spectrophotometry and Flame photometry.		14
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Environmental Studies by Benny Joseph, McGraw Hill Education; Third edition, 2017. 2. Fundamentals of Environmental Studies by Mahua Basu and Xavier Savarimuthu SJ, Cambridge publications, 2017. 3. Environmental Science: Toward a Sustainable Future, Richard T. Wright, Dorothy F. Boorse, Pearson Publications, 12th Edition, 2015. 4. Environmental Science by S. C. Santra, New Central Book Agency; 3rd edition, 2011. 			

Programme/Class: Certificate		Year: First	Semester: Second
Theory		Subject: Environmental Sciences	
Course Code: DSC – 4		Course Title: Environmental Pollution and Management	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Understand the basic concept of pollution and its effect on environment. • Develop understanding about history, sources, types and effect of air, water and soil pollution. • Gain skills on various control measures of pollution problems. • Understand the solid waste pollution, noise pollution, radioactive and thermal pollution. • Gain knowledge about sustainable management of different wastes. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Environmental Pollution: Introduction; Roots of Our Environmental Problems; Pollution and Pollutants; Principal Pollutants; Classification of Pollutants; Cost of Pollutants; Types of Environmental Pollution; Pollution and Environmental Ethics.		10
II	Air pollution: History, Sources, Types, Effects and Control of air Pollutants (Particulate Matter, Oxides of CO _x , NO _x , SO _x); Factors affecting distribution of air pollution; Photo Chemical Smog; Monitoring of air quality; Greenhouse effect, Ozone depletion, and Acid Rain; National Air Quality Monitoring Program; AQI.		14
III	Water Pollution: Types and sources of Water Pollutions; impact on humans, plants and animals; Water Quality Parameters- DO, BOD, COD, Acidity, Alkalinity, Salinity, Hardness; Drinking Water Quality Standards; Water Treatment- Adsorption, Flocculation, Ion Exchange and Reverse Osmosis Methods; Eutrophication, Algal bloom.		14
IV	Soil Pollution: Physico-Chemical and Biological Properties of Soil (structure, texture, inorganic, organic); Soil Pollution sources and control measures; Metal and Pesticides; Solid Waste Pollution: Municipal solid waste, Biomedical Waste, Hazardous Waste; Container Systems; Solid Waste management: Concept of 3R; Composting and Vermicomposting.		12
V	Noise Pollution: Source of noise, Noise exposure level, Effect of noise, Noise Pollution Control; Radioactive Pollution: Types of radiations, Sources of radiations, Biological effects of radiations; Thermal pollution: Cause, Effect and Control; E-Waste.		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Air Pollution, Rao. M. N. and Rao, H. V. N., Tata McGraw -Hill Publishing Company, New Delhi. 2. Environmental Pollution and Control, 4th edition, J. Jeffrey Peirce, Ruth E Weiner, E Aarne Vesilind, Boston Oxford Johannesburg Melbourne New Delhi Singapore. 3. Principles of Environmental Chemistry, 3rd edition, J. E. Girard, Jones & Bartlett Learning, Company, Burlington. 4. The Science of Environmental Pollution, 3rd edition, Frank R. Spellman, CRC Press, Taylor & Francis Group. 			

Programme/Class: Certificate	Year: First	Semester: Second
Practical	Subject: Environmental Sciences	
Course Code: P – III	Course Title: Practical DSC – 3 + DSC – 4	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Practical knowledge for the determination of different water parameters. • Practical know how for the analyses of different air pollutants. • Gain knowledge on segregation and components of waste. • Learn measurement of noise level of different areas. 		
Credits: 2 + 2 =4	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
<p style="text-align: center;">Lab Experiment List:</p> <ol style="list-style-type: none"> 1. Determination following Water parameter: <ol style="list-style-type: none"> i. DO ii. BOD iii. Alkalinity iv. Acidity v. TDS vi. Hardness 2. Determination following air pollutants: <ol style="list-style-type: none"> i. RSPM ii. SPM 3. To estimate the amount dust (particulate matter) deposition on the leaves of roadside plants. 4. To segregate domestic waste into bio-degradable and non-biodegradable components. 5. Determination the Noise levels of residential, institutional and industrial area. 		

Programme/Class: Diploma		Year: Second	Semester: Third
Theory		Subject: Environmental Sciences	
Course Code: DSC – 5		Course Title: Biodiversity and its Conservation	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Gain knowledge on biodiversity its value and various approach for conservations. • Biodiversity of India and role of local communities and traditional knowledge in conservation. • Develop knowledge about biodiversity identification and IUCN. • Understand the various conservation process. • Learn wildlife its importance, threat and management. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Biodiversity: Basic concepts and importance; Types (Species diversity, Genetic diversity, Ecosystem diversity); Measurement of Biological Diversity; Biological and Phylogenetic Species Concept; Basic Concept of Species and Speciation.		10
II	Identification: Concept and basis of identification of Biodiversity Hotspots; hotspots in India. Factors for Decline of Biological Diversity, Concept of Extinction, Threatened and Endangered Species; IUCN categorization.		12
III	Conservation: Approaches for Conservation of Biological Diversity: <i>In-situ</i> conservation, <i>Ex-situ</i> conservation; Role of local communities and traditional knowledge in conservation; Biodiversity convention; International and national efforts to conserve biodiversity.		14
IV	Biodiversity of India: India as a mega diversity nation; Biogeographic zones of country; Forest Types and Forest Cover in India; National parks, Sanctuaries, and Sacred groves in India; important conservation projects; Concepts of gene pool, Biopiracy and bio-prospecting.		14
V	Wildlife: General introduction; Definition, Importance; Reason for wildlife Depletion; Wildlife Management; Protection of Wild Flora, Fauna and Natural Habitats.		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. The Biodiversity of India, Bharucha Erach, Mapin Publishing Pvt. Ltd. 2. Ecology and Environment: P.D. Sharma., Rastogi Publication. 3. Biodiversity: An Introduction, Gaston, K. J. & Spicer, J. I., Blackwell Science, London, UK. 4. Global Biodiversity: Status of the Earth's Living Resources, World conservation Monitoring Centre, Groombridge, B., UNEP, Cambridge. 5. Biodiversity: a beginner's guide, John I. Spicer, Oneworld Publications. 6. Environmental Science: S. C. Santra, New Central Book Agency. 			

Programme/Class: Diploma		Year: Second	Semester: Third
Theory		Subject: Environmental Sciences	
Course Code: DSC – 6		Course Title: Natural Resources and its Management	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Develop the understanding on natural resources and their significance. • Able to know the strategies for sustainable management. • Understand the basic principles and application of remote sensing and GIS techniques. • Gain skills on renewable energy resources and bio-energy options. • Understand the present scenario of states on different environmental issues related to mining. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Natural Resources: Concept and types of natural resources; classification of natural resources; Factors influencing resource availability, distribution and uses; Interrelationships among different types of natural resources.		10
II	Land Resource: Soil types, profile and composition; degradation of land and agricultural lands; impacts of land use on environment; Soil Management: Soil erosion and Conservation, Desertification; Soil reclamation.		10
III	Water Resources: Surface and Ground Water- distribution and supply; Causes of water resource depletion; water resource management- Ground water recharging, rain water harvesting; Watershed management; Wetlands: definition, importance and classification.		14
IV	Forest Resource: Types and extent of forests in India; forest fragmentation; Importance of Forest; Exploitation of Forest resources; Deforestation; Forest Management; National forest policy; Carbon Sequestration.		10
V	<p>Agriculture Resources: Types of Agriculture; Basic Resources of Agriculture; Major Crop of India; Agriculture and Environment; Effect of Modern Agriculture; Fertilizer-Pesticides Problems; Agroforestry; Social Forestry.</p> <p>Mineral Resources: Types, distribution and reserves of mineral resources; use and exploitation; environmental effects of mining; Case Studies- Mining in Aravali Hills; Bundelkhand Region; Sand mining in UP; Remote Sensing and GIS: Basic Principles and Application.</p>		16
<p>Suggested Readings</p> <ol style="list-style-type: none"> 1. Ecology and Environment: P.D. Sharma., Rastogi Publication. 2. Ecology of Natural Resources, Ramade, F., John Wiley & Sons Ltd. 3. Singh, J.S., Singh, S.P. and Gupta, R.S., Ecology, Environment and Resource Conservation, Anamaya Publishers, New Delhi. 4. Text Book of Environmental Studies, Erach Bharucha, Orient longman Pvt. Ltd., Ernakulam. 5. Encyclopedia of Indian Natural History, Hawkins R.E., Bombay Natural History Society, Bombay. 6. Fundamental of Remote sensing, Joseph, G., 2018, University Press (India) Private Ltd, Hyderabad. 			

Programme/Class: Diploma	Year: Second	Semester: Third
Practical	Subject: Environmental Sciences	
Course Code: P – V	Course Title: Practical DSC – 5 + DSC – 6	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Learn to prepare the field report and herbarium sheet. • Practical skills about analyses of primary productivity and chlorophyll content. • Gain knowledge on analysis and interpretation of different physical properties of soil. • Understand the morphological and anatomical adaptations of different plants species. • Learn to identify the rocks and minerals 		
Credits: 2 + 2 =4	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
<p style="text-align: center;">Lab Experiment List:</p> <ol style="list-style-type: none"> 1. Preparation of field report based on the survey of local flora (herbarium sheet). 2. To determine the primary productivity by light and dark bottle method. 3. To determine chlorophyll content of the given plant material. 4. To study pore space, water holding capacity and bulk density of soil. 6. Qualitative analysis of soil organic carbon, Soil pH. 7. To study the morphological and anatomical adaptations of the given hydrophytes. 8. To study the morphological and anatomical adaptations of the given xerophytes. 9. To study the morphological and anatomical adaptations of the given mesophytes. 10. Identification of rocks and minerals on the basis of physical characters. 		

Programme/Class: Diploma		Year: Second	Semester: Fourth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 7		Course Title: Environmental Legislation and Impact Assessment	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Understand the basic laws, act, treaty related to environment. • Gain knowledge on public policies and PIL. • Understand the Environment provisions in constitution • Able to know the power and functions of government agencies for pollution control. • Learn the national action plan for sustainable environment. • Develop understanding about environmental impact assessment and auditing. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	<p>Environmental Laws: National Environmental Policy Statement on abatement of pollution legislation; The Air (Prevention and Control) Act, 1981; The Water (Prevention and Control) Act, 1974; The Environmental (Protection) Act, 1986; The Forest Conservation Act, 1980; The Wildlife Protection Act, 1972; Biodiversity Act, 2002.</p> <p>Ecological footprint, Carbon Footprint, Carbon Trading, Carbon Diet, Carbon Credits.</p>		14
II	<p>Organizations and Conventions: National and International Organizations dealing with Environmental Issues; Famous Environmental Conventions; Role of Government and NGO's in environmental protection; Women participation;</p>		14
III	<p>National Action Plan: National Action Plan on Climate Change- Eight National missions– Solar Mission, Mission for Enhanced Energy Efficiency, Mission on Sustainable Habitat, Water Mission, Mission for Sustaining the Himalayan Ecosystem, Mission for a 'Green India', Mission for Sustainable Agriculture, Mission on Strategic Knowledge for Climate Change).</p>		10
IV	<p>EIA: Aims and objectives of Environmental Impact Assessment; EIS; EMP; Environmental Clearance; Impact Assessment Methodologies; EIA Notification –2006 and amendments; Public Participation; Status of EIA in India-Current trends and strategies.</p>		12
V	<p>Environmental Audit: Life-cycle analysis; cost-benefit analysis; Guidelines for Environmental Audit; Environmental Management System Standards (ISO 14000 series); Eco-labeling schemes, Eco-tourism.</p>		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Trivedi R.K., Enviro Media. 2. Environmental Protection and Laws, Jadhav, H & Bhosale, V.M., Himalaya Pub. House, Delhi. 3. Text Book on Environmental Impact Assessment, Barthwal, R. R., New Age International Private Limited. 4. Environmental Impact Assessment, Canter, L.W., McGraw Hill, New York. 5. Environmental Audit, Shrivastava, A. K., New Delhi, India. 			

Programme/Class: Diploma		Year: Second	Semester: Fourth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 8		Course Title: Solid and Hazardous Waste Management	
<p>Course outcomes: This course provides an overview of :</p> <ul style="list-style-type: none"> • municipal solid waste (MSW), • Industrial waste and hazardous waste and their management. • It also deals with the planning, control measures, treatment methods, • Regulations in the management of solid and hazardous wastes. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Sources, Generation and Characterization : Definition, Sources and generation of municipal solid wastes, their classification and chemical composition; Combustion characteristics (proximate and ultimate composition) of solid wastes; Definition and classification of hazardous wastes.		14
II	Effect of solid waste disposal on environment : Impact of solid waste on environment, human and plant health; effect of solid waste and industrial effluent discharge on water quality and aquatic life; mining waste and land degradation; effect of landfill leachate on soil characteristics and ground water pollution.		14
III	Solid waste Management : Collection, storage, transportation and disposal of solid waste; landfill (traditional and sanitary landfill) design; thermal treatment (pyrolysis and incineration) of waste material; Integrated Solid Waste Management; Hazardous and non-hazardous waste management; E-Waste management, Levelling and Ecomark; NIMBY principle.		10
IV	Resource Recovery : 4R - Reduce, Reuse, Recycle and Recover; biological processing-composting and vermicomposting, aerobic treatment; reductive dehalogenation; mechanical biological treatment; green techniques for waste treatment.		12
V	Concept of energy recovery from waste; refuse derived fuel (RDF); Different WTE processes: combustion, pyrolysis, landfill gas (LFG) recovery; anaerobic digestion; gasification.		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Design of Landfills and Integrated Solid Waste Management. Bagchi, A., 2004. John Wiley & Sons. 2. Basic Hazardous Waste Management. Blackman, W.C., 2001. CRC Press. 3. Solid and Hazardous Waste Management by Cherry , P.M., 2005. (PB): CBS Publisher. 			

Programme/Class: Diploma	Year: Second	Semester: Fourth
Practical	Subject: Environmental Sciences	
Course Code: P – VI	Course Title: Practical DSC – 7 + DSC – 8	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Learn to perform the environmental audit in terms of energy consumptions. • Understand to do EIA study for some projects. • Gain field knowledge functioning of water treatment and sewage treatment plant. 		
Credits: 2 + 2 =4	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
<p style="text-align: center;">Lab Experiment List:</p> <ol style="list-style-type: none"> 1. To make an audit of the electrical energy consumption by various household appliances. 2. Hypothetical EIA of following: <ol style="list-style-type: none"> i. Urbanization ii. Tourism 3. Visit and report to study the functioning of water treatment/ Sewage treatment plant. 4. Sample preparation and sampling techniques 5. Analysis of solid waste/sludge for moisture content. 6. Determination of Calorific Value 		

Programme/Class: Degree		Year: Third	Semester: Fifth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 9		Course Title: Environmental Microbiology and Biotechnology	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Impart knowledge on microbial diversity and recent advancement. • Gain in-depth knowledge of role of beneficial and pathogenic microorganisms in environment. • Understand the application of microbes for production of different eco-friendly products. • Understand molecular biotechnology and its applications in Environmental management. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	<p>General Environmental Microbiology : Environmental Microbiology: Definition and Scope Environmental microbial processes including nutrient cycle (Carbon, Sulphur Nitrogen and Phosphorus Cycle). Famous Environmental microbiologist and their work in India. Importance of microbes in the environment; Microbial pathogens and Parasites and their effects on Human, Animal and Plant health,</p>		10
II	<p>Microbial population in Air : Indicator microorganisms in air, Distribution and sources of air borne microorganisms Air borne diseases Bioleaching of metals, acid mine drainage</p> <p>Microbial Population in Water: Microbial communities in natural water Sanitary quality of water : bacteriological evidence of faecal pollution, indicators of faecal pollution. Bacteriological analysis techniques of water</p>		14
III	<p>Food microbiology: Spoilage and Preservation of foods; Fermented food; food poisoning; Microbiology of milk;</p> <p>Industrial Microbiology: Industrial use of bacteria, fungi, yeast, biogas production, vaccine production; Role of microbes in production of biopolymers and biodegradable plastics.</p>		14
IV	<p>Microbial Diversity in Soil: Introduction and historical background of soil microbiology, Soil microflora, Interactions among soil microorganisms: neutralism, symbiosis, commensalisms, ammensalism, parasitism and predation.</p> <p>Sewerage system: Composition of sewage, kinds of sewerage systems-sanitary, storm and combined sewers Microorganisms in sewage-fungi, protozoa, algae, bacteria and viruses.</p>		12
V	<p>Biotechnology: Scope and Importance of Biotechnology; Development of genetically engineered microorganisms (GEMs); Biotechnology and its application-, Biofertilizer, Vermiculture Technology, Biomining, Biosensors.</p>		10
<p>Suggested Readings</p> <ul style="list-style-type: none"> • Environmental Microbiology by Mitchell R, 2nd Edition WILEY INDIA publications, 2016. • Environmental Microbiology by Buckley R G CBS Publications, 2005. • Environmental Microbiology by Annet Blogger, Oxford Book Company, 2010. 			

Programme/Class: Degree		Year: Third	Semester: Fifth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 10		Course Title: Advances in Noise Pollution Abatement Technologies	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Impart knowledge on the sources, effects and control techniques of noise pollution. • Impart knowledge about the preventive measures against noise pollution. • Understand the nature and characteristics of noise pollution and basic concepts of noise control management. • The students will able to identify, formulate and solve noise pollution problems. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Introduction: Fundamentals of Noise: Sound power, Sound intensity and Sound pressure levels. Effects of noise - Presbycusis, Acoustic Trauma. Characterization of Noise from Construction, Mining, Transportation and Industrial Activities. Permissible noise levels in different zones, Noise standards and indices		10
II	Noise monitoring: ambient and road traffic noise monitoring, Noise Control measures, Design of Sound Absorption, Acoustic Barrier, Vibration Isolation, Vibration Damping, Muffling, Personal Protector and Green Belt for noise attenuation.		14
III	Ground Vibration and Air Blast - Environmental impacts, strategic planning and abatement. Environmental noise modeling: Important conditions, its scope and limitation , Noise assessment and purposes. Environmental and health effects; strategic control and abatement measures.		14
IV	Assessment of atmospheric attenuation with respect to enclosures, barrier, geometric spreading, air absorption, wind & temperature gradient, Ground effect, shielding by vegetation/greenbelt; and projections of noise contouring of the concerned area. Noise mapping and applications of salient noise models		12
V	Prevention of Noise Pollution Noise Pollution (Regulation and Control) Rules, 2000 Authority List for Implementation of Noise Rules 2000		10
<p>Suggested Readings</p> <ul style="list-style-type: none"> • Environmental Noise Pollution – PE Cunniff, McGraw Hill, New York. • Noise Control: Principles and Practices - Bruel & Kjaer, 2nd ed. B & K Pub., Denmark. 			

Programme/Class: Degree		Year: Third	Semester: Fifth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 11		Course Title: Energy Management and Development	
<p>Course outcomes: This course provides an overview of :</p> <ul style="list-style-type: none"> • <i>The students will be exposed to different types of energy resources and also the global energy budget.</i> • <i>Also they will be able to widen their knowledge in different types of wastes material from which energy can be derived</i> • <i>The energy use patterns in India and world.</i> 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Non- Renewable Energy Resources: Sources and Categories, Current Status of Exploitation viz. Coal, Petroleum, Natural Gas, Nuclear Fuel with Reference to India and global scenario - Fossil Fuel Uses - Energy Production Consequence on Environment.		14
II	Renewable Energy Resources: Sun as Source of Energy, Nature of its Radiation, Heat Budget of Earth, Earth's Temperature and Atmosphere Current Status of Usage viz. Introduction to Solar energy harnessing systems – thermal and Photovoltaic - Wind- Wind Power, Harnessing of Wind Energy, Power Generation – Wind Mills, Wind Energy Potential in India.		14
III	Other Energy Sources: Tidal – OTEC – Geothermal - Sources – Crust, High Temperature Aquifers, Low Temperature Aquifers, Reserves; Harnessing of Geothermal Energy – Problems and Prospects; Geothermal Energy Prospect in India - Hydel Energy- Principles of Generation of Hydroelectric Power-micro Hydel Power Plants.		10
IV	Waste to Energy: Biomass Composition and Types; Conversion Processes – Pyrolysis, Gasification and Liquefaction; Energy Plantation; Biogas –Production and Uses - Types of Biogas Plants - Environmental Constraints; Microbial fuel cells.		12
V	Energy Use Pattern: Energy Use Pattern in India and in Different Parts of the World - Conventional (Coal, Oil and Natural Gas) and Non Conventional Energy Resources (Solar, Wind, Geothermal, Hydel) and their Impacts on Environment.		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Critical Reflections on Nuclear and Renewable Energy, Way Kuo (2014), Scrivener Publishers Wiley. 2. Non-Conventional Energy Sources, Rai, G.D.(2001), Khanna Publishers, New Delhi. 3. Solar Energy, Sukhatme, S.P.(1996), Tata Mc Graw Hill Publishing Company. 4. Renewable Energy Sources & Conversion Technology, Bansal N. K., Kleemann M. & Michael, Meliss., (1990), Tata Mc Graw Hill Publishing Company. 5. Biotechnology and Oother Alternative Technologies, Chakraverty, A. (1998.). Oxford and IBH Publishing Co. Pvt. Ltd., 			

Programme/Class: Degree	Year: Third	Semester: Fifth
Practical	Subject: Environmental Sciences	
Course Code: P – VIII	Course Title: Practical DSC – 9 + DSC – 10 + DSC – 11	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Gain practical skills of microbiology techniques. • Able to isolate the bacteria from different environmental matrices. • Learn measurement of noise level of different areas. 		
Credits: 2 + 2 + 2 = 6	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
<p style="text-align: center;">Lab Experiment List:</p> <ol style="list-style-type: none"> 1. Demonstration of Pouring, Streaking and Spreading techniques. 2. Isolation of bacteria from following matrices: <ol style="list-style-type: none"> i. Air ii. Water iii. Soil iv. Vegetables v. Curd 3. Determination the Noise levels of residential, institutional and industrial area. 		

Programme/Class: Degree		Year: Third	Semester: Six
Theory		Subject: Environmental Sciences	
Course Code: DSC – 12		Course Title: Environmental Priorities and Research Tools	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Learn about general national environmental movements. • Able to understand the environmental priorities in India. • Develop understanding about different environmental disasters and their management. • Gain knowledge on basic of statistics and instrumentation. 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	National Environmental movement: Silent valley movement, Chipko movement, Narmada movement, Green Revolution, Appiko movement, Tehri Dam movement; Namami Gange and Yamuna Action Plan; International Solar Alliance.		12
II	Environmental Priorities in India: Sustainable Development; Urban and Rural planning, Power generation; Human Population Explosion; Environment and human health; Sanitation and health education; Role of information technology in environment and human health.		10
III	Environmental Disaster & Toxicology: Natural hazards; earthquake, flood, cyclones, landslides, desertification and fire; Resettlement and rehabilitation process; NDRF/SDRF; NDMA;		14
IV	Environmental Approaches: Population growth, variation among nations, Need for gender equity, Population explosion - Family Welfare Programme. Human Rights and Value Education. National Green Tribunal		14
V	Biostatistics: Introduction and historical perspective; definition; characteristics and application of biostatistics; statistical terms and symbols; mean, mode and median; variance and standard deviation.		12
<p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. Ecology and Environment: P.D. Sharma., Rastogi Publication. 2. Disaster Management, Singh, S. and Singh, J., Pravalika Publications, Allahabad. 3. Elements of Biostatistics, Prasad. S., Rastogi Publications, Meerut. 			

Programme/Class: Degree		Year: Third	Semester: Sixth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 13		Course Title: Global Climate Change	
<p>Course outcomes: This course provides an overview of :</p> <ul style="list-style-type: none"> • Main aspects of climate • Affected due to various anthropogenic activities. • It also covers the Science of climate changes and risks it causes. • Potential social, economic and environmental consequences of climate change and the actions plans involved in its mitigation 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	Introduction: Climate in the spotlight climate and weather, climate of India, Natural greenhouse effect, climate change factors – Natural factor & Anthropogenic factor.		14
II	Global warming : Greenhouse gases: role of CO ₂ , role of CH ₄ , Global warming potential, CO ₂ Emission – human Emission of CO ₂ , Remedial measure to reduce global warming, Global cooling.		14
III	Ozone Layer Depletion : Vienna convention on the protection of ozone layer – 1985, Montreal protocol, protection and maintenance of ozone layer, Indian efforts for ozone layer protection. El-Nino and its effects, La-Nina, impact of climate change on India.		10
IV	Sustainable Development: Brundtland Commission, UN Environmental Agenda, role of U.N. agencies, World Environment Organization, climate change convention-1992, Earth Summit, Agenda 21, IPCC, Global Environment Facility		12
V	Impact of Climate Change and Global Warming : Impact of Climate Change in India: Pattern change of Rainfall, Drought, Effects on water resources, Sea Level Rise, Impacts on Agriculture, Impacts on food security, Impacts on Glacier, Impacts on Health, Impacts on energy security, Impacts on Biodiversity. Climate change & disaster in India, Urban flood, Cyclone, Forest fire		10
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Encyclopedia of Global Warming and Climate Change By George Philander, SAGE Publications Inc; First edition, 2008. 2. Atmosphere, Weather and Climate By Roger G. Barry, Richard J Chorley, CRC Press, 2010. 3. Global Warming: The Complete Briefing By John Houghton, Cambridge University Press; 4th edition 2009. 			

Programme/Class: Degree		Year: Third	Semester: Sixth
Theory		Subject: Environmental Sciences	
Course Code: DSC – 14		Course Title: Green Management	
<p>Course outcomes: This course provides an overview of :</p> <ul style="list-style-type: none"> • Learn about environmental ethics • Learn about environmental awareness • Also learn about green consumerism and polluters pay principal • Gain knowledge about ISO certification and environmental marketing 			
Credits: 4		Compulsory	
Max. Marks: 25+75		Min. Passing Marks: As per norms.	
Unit	Topic		No. of Lectures
I	<p>Environmental philosophy and environmental ethics Environmental ethics a brief history, understanding the meaning of value, environmental philosophies. Environmental awareness – Before the Publication of Silent Spring in 1962, Environmental Movement from 1962 to 1992, Environmental Movement since the 1980s to the Present Day.</p>		14
II	<p>The Rise of Green Consumerism: Green Consumerism – Definition, The Green Consumer, Can Green Consumerism Stop the Ecological Crisis. The Polluter Pays Principle: Definition of PPP, History of PPP, Defining Pollution in the Context of PPP, Application of PPP.</p>		14
III	<p>Pollution Control Policy – II Command and Control: A General Definition of Command and Control, Command and Control as an Environmental Policy Measure. Environmental Auditing: Definition, Aims and Objectives of Environmental Audit, Advantages of Environmental Audit.</p>		12
IV	<p>Environmental Certifications: The ISO 14000 Family, Components of ISO 14000, Global ISO Certifications.</p>		8
V	<p>Environmental Marketing Definitions, Reasons for the Adoption of Green Marketing by Firms, Problems with Green Marketing, Greenwashing Defined, Eco-labelling: A Mark for the Future, Eco Labels Schemes in Various Countries.</p>		12
<p>Suggested Books:</p> <ol style="list-style-type: none"> 1. Green Management, theory and application by M. Karpagam and Geetha Jaikumar, Published by Ane Books Pvt. Ltd. 2010. 2. Environmental Studies by Beny Joseph, Tata Macgraw Hill Publication, 2010. 3. N. K. Uberoi, Environmental Management, Excel Books, New Delhi 			

Programme/Class: Degree	Year: Third	Semester: Sixth
Practical	Subject: Environmental Sciences	
Course Code: P – IX	Course Title: Practical DSC – 12 + DSC – 13 + DSC – 14	
<p>Course outcomes: After completing the course the student will be able to:</p> <ul style="list-style-type: none"> • Gain practical skills of basic statistical parameters. • Able to perform environmental audit report. • Learn to prepare graphical representation of observed environmental data. 		
Credits: 2 + 2 + 2 = 6	Core Compulsory	
Max. Marks: 50 + 150	Min. Passing Marks: As per norms.	
<p style="text-align: center;">Lab Experiment List:</p> <ol style="list-style-type: none"> 1. Calculation of mean, mode and median from data. 2. Calculation of standard deviation from data. 3. Calculation of variance from data. 4. Environmental auditing by Checklist method 5. Preparation of wind rose diagram. 6. Field survey and case study report preparation on any environmental issue. 		