



Centre for Distance and Online Education, Rabindra Bharati University

*Syllabus for MA in Environmental Studies (Semesterised CBCS Mode)
Session 2020-21 onwards*

The salient features of the proposed changes are as follows:

- ✓ Incorporation of Semester system of Studies
- ✓ There shall be four semesters of 25 credits each, totaling to 100 credits
- ✓ In all there shall be 14 core courses including one special course of dissertation work and one practical course, 4 compulsory elective course and 2 open elective courses

The structure of the course will be as follows:

First Semester: 5 Core Units of total 25 credits.

Second Semester: 5 Core Units of total 25 credits.

Third Semester: 3 Core Units and 2 compulsory electives of total 25 credits.

Fourth Semester: 1 Core Unit, 2 compulsory electives and 2 open electives of total 25 credits

For each unit in each semester, 40 marks are for examinations and 10 marks are for internal assessment.

The syllabus of the core papers, compulsory elective papers and open elective papers are in lines with the UGC model curriculum with minor changes to suit present circumstances and keeping in mind that Environmental Studies is a multidisciplinary subject and students join in this course from different undergraduate courses.



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Semester	Course Code	Course name	Credits	Marks
I	CC 1.1	Society, Development and Ecology	5	50
	CC 1.2	Environmental Pollutions I	5	50
	CC 1.3	Natural Resources and Environment	5	50
	CC 1.4	Environmental Politics	5	50
	CC 1.5	Environmental Policies, Laws and Regulations	5	50
II	CC 2.1	Wetland, marine, hill ecology and environmental forestry	5	50
	CC 2.2	Environmental Pollutions II	5	50
	CC 2.3	Environmental Geology and Remote Sensing	5	50
	CC 2.4	Practical in Environmental Studies	5	50
	CC 2.5	Environmental Economics and Statistics	5	50
III	CC 3.1	Sustainable Development	5	50
	CC 3.2	Hydrology and Water Resources	5	50
	CC 3.3	Atmosphere and Global Climate Scenario	5	50
	CEC 3.1/ 3.1A	Environmental Management I/Man and Environment I	5	50
	CEC 3.2/ 3.2A	Environmental Management II/Man and Environment II	5	50
IV	CC 4.1	Dissertation	5	50
	CEC 4.1/ 4.1A	Environmental Management III/Man and Environment III	5	50
	CEC 4.2/ 4.2A	Environmental Management IV/Man and Environment IV	5	50
	OEC 4.1/ 4.1A	Disaster Management I/Museum and Environment I	5	50
	OEC 4.2/ 4.2A	Disaster Management II/Museum and Environment II	5	50
Total			100	1000

Semester I

Course code	Unit	Syllabus for semesterized course curriculum	Marks
CC 1.1	Society, Development and Ecology		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Views of Rabindranath Tagore and other Indian thinkers on environment</i>	
	2	<i>Development and displacement:</i> Need for development – Antidevelopment – maldevelopment – Development and displacement of population in India	
	3	<i>Concept of ecology and ecosystem:</i> Structure and function of ecosystem, Biotic factor – relationship among organism, positive and negative interactions	
	4	<i>Concept of population and community ecology:</i> Characteristics, dynamics – composition, structure, origin and development of a community, niche and habitat concept, succession; ecological dimensions in development in India with environmental priorities in India	
	5	<i>Environmental communication</i>	
CC 1.2	Environmental Pollutions I		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Air pollution:</i> Classification, vehicular and industrial pollution, Green-house effect, ozone layer depletion, acid rain, particles, ions and radicals in the atmosphere, chemical processes for formation of inorganic and organic particulate matter, thermo-chemical and photochemical reactions in atmosphere, chemistry of air pollutants, photochemical smog.	
	2	<i>Ground water issues:</i> Ground water issues, aquifers, hydrological cycle, surface and subsurface water, rain water harvesting and ground water recharge	
	3	<i>Water pollution:</i> Pollutants in surface and ground water and their treatment, water treatment plant and treatment processes, bacteriological sampling and analysis for quality.	
	4	<i>Chemistry of water:</i> Concepts of BOD, COD, DO.	
	5	<i>Sewage and waste water treatment</i>	
CC 1.3	Natural Resources and Environment		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Natural resources and associated problems</i>	
	2	<i>Water resources and national status</i>	
	3	<i>Mineral and land resources: National status, land use planning</i>	
	4	<i>Food resources and national status</i>	
	5	<i>Energy resources and national status</i>	
CC 1.4	Environmental Politics		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Environment, culture and politics:</i> The Westphalian system, rethinking the ecology – sovereignty debate	
	2	<i>North vs South – international co-operation and conflict</i>	
	3	<i>Biosphere Conferences:</i> From Stockholm to Rio and beyond: globalization of the environmental agenda – UNCED and post UNCED	
	4	<i>Civil society and marginal voices:</i> Indigenous people – women – eco-feminism, Major environmental movements in India and abroad	
	5	<i>Environmental politics in India:</i> Major issues – environmental politics among neighboring countries, Politics of environment-International protocols and treaties, Environment in Indian economy with diversities and Environment in India under 5 Yr plans and constitution.	
CC 1.5	Environmental Policies, Laws and Regulations		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Environmental ethics and major environmental laws:</i> Growth of environmental laws and procedure in India, Quasi administrative environmental laws	
	2	<i>Environmental Treaties, Laws and Policies:</i> Environmental laws at the international level, National policy on environment and practice Environment in	

		India	
	3	<i>Environmental Protection Act:</i> Prohibition and restriction on the location of the industries. EPA (Environmental Protection Act, 1986) Administrative adjudication and agencies implementing Courts, People, NGOs and environmental laws	
	4	<i>Environmental monitoring and role of West Bengal Pollution Control Board</i>	
	5	<i>Human rights and environment</i>	

Semester II

Course code	Unit	Syllabus for semesterized course curriculum	Marks
CC 2.1	Wetland, marine, hill ecology and environmental forestry		50
	1	<i>Urbanization and urban environment in India</i>	[40 (exam)+ 10 (internal assessment)]
	2	Wetland and Coral Reef ecology: Energy flows, food chain, food web, ecological pyramids, community ecology, parasitism, prey and predator relationship, Wetlands – definition and classification, threats, conservation. Ramsar conservation. Coral reef formation, importance, threats, coral reefs and climate change	
	3	Marine ecology: Ecological importance of mangrove vegetation, distribution of mangrove areas in India, salinity ingress in coastal areas. Marine Environment: Biota in different types of zones, its diversity-plankton, nekton, benthos, their adaptations and productivity, Indian marine territory, Exclusive Economic Zones (EEZ)	
	4	Forest ecology: Definition of forest and forestry; Classification of forest and their distribution with special reference to mangrove forest. Composition of forest – fundamentals of forest population, community, succession, climax; components of a forest ecosystem. Interrelationship among different components in forest ecosystem endemic Ecological values of forest, forest types of the world and India	
	5	Social forestry: Conservation of forest – definition, National and international conservation strategies. Indian Forest Conservation Act 1980, 1988). Importance of indigenous knowledge and peoples participation in forest conservation. Knowledge about – World Forestry day, World Environment Day, Vanamahotsav, Aranya Saptaha. Forest Biotechnology – Forest resources & bioprocess	
CC 2.2	Environmental Pollutions II		50
	1	<i>Marine and river pollution</i>	[40 (exam)+ 10 (internal assessment)]
	2	<i>Radioactive, thermal, odor, vision and noise pollution</i>	
	3	<i>Industrial waste and treatment processes</i>	
	4	<i>Pollution due to population explosion and habitat degradation</i>	
	5	Soil pollution: Soil chemistry, inorganic and organic components of soil, nitrogen pathways, pH, NPK and organic carbon in soils, Solid and bio medical waste pollution and management	
CC 2.3	Environmental Geology and Remote Sensing		50
	1	History of the Earth: Origin and evolution of earth, plate tectonics and sea floor spreading, continental drift and mountain building	[40 (exam)+ 10 (internal assessment)]
	2	Glaciers: Physical and chemical aspects, Mass balance, Recession of Himalayan glaciers, Glaciers as index of climate change.	
	3	Petrology and Pedology: Rock types – igneous, metamorphic and sedimentary; Soil formation, composition, and classification; Soil profile, Mineral deposits – formation and classification	
	4	Climatology: Weather Elements and their variations; Heat balance of the earth atmosphere system, Earth as a heat engine, Major climatic zones of the world, Climates of India, Climate and vegetation, Climatic extremes - environmental implications, Global climate change and its impact on environment	
	5	Remote sensing and GIS: Remote sensing application in GIS interface of GIS &	

		RS, Application in Environmental studies, Maps & spatial information, the components of geographical information system, Using of GPS in Environmental management	
CC 2.4	Practical in Environmental Studies		50
	1	Analytical methods in Environmental Quality Assessment: Principles of titrimetry; Gravimetry; Colorimetry; Spectrophotometry; Spectrofluorimetry; Flame photometry, AAS; Chromatographic techniques; Gel electrophoresis and X-ray diffraction techniques, Photochemistry,; Chemical, photochemical and photosensitized reactions in the atmosphere, Flame photometer: Application of flame photometry in estimation of metals viz' K and Na , AAS: Determination of the concentration of As, Pb, Cr using AAS, Noise Pollution by Decibel meter	[40 (exam)+ 10 (internal assessment)]
	2	Microbiological analysis: Isolation and characterization of bacteria, fungi, from soil & water. Coliform detection of drinking water, Antifungal and antibacterial activity of toxic compounds	
	3	Analysis of soil quality: Quadratic study of soil. Physiochemical analysis of soil- pH, conductivity, organic carbon, hardness, Calcium carbonate, Available Phosphate, Available Potassium, Nitrate – Nitrogen, Ammonical Nitrogen, Percent of organic carbon	
	4	Analysis of water quality: Common Pollutants: Colour, Odour, TDS and TSS, Particle size analysis, pH value, Temperature, Oil and Grease, Nitrate –Nitrogen, Total residual Chlorine, Iron, Fluoride, Chloride, Hardness, Arsenic, Lead, Hexavalent Chromium, Sulphate, Chemical Oxygen Demand, Biochemical Oxygen Demand (for 3 days at 27 °C)	
	5	Analysis of air quality: SOX, NOX, Ozone, CO ₂ , Suspended Particulate Matter	
CC 2.5	Environmental Economics and Statistics		50
	1	Relationship between environment and economy: Environment-economy circular relationship-Laws of Thermodynamics, Environmental Kuznets Curve (EKC): Concepts and Genesis. Explanations of inverted-U shaped EKC- Empirical evidence-N-shaped EKC	[40 (exam)+ 10 (internal assessment)]
	2	Environmental economics: Environmental Pollution as a Negative Externality (Pigou), The issue of Property Rights (Coase theorem), Tax vs. Standard	
	3	Basic issues of environmental valuation and impact of economic policies on environment: Concept of willingness to pay and willingness to accept, Revealed Preference Approach- household production function, travel cost, hedonic price, statistical value of life, Approach-contingent valuation method; Environmental problems due to underdevelopment and economic growth and over population with Environment under economic reforms: official policies and future trends – Indian example	
	4	Cost benefit analysis: Identification & prediction of impacts of development project	
	5	Descriptive statistics: Collecting of data, tabular representation, sample survey, concept of frequency, relative frequency, class limit, class boundaries, diagrammatic representation (bar chart, pie chart, frequency polygon, histogram and ogive)	

Semester III

Course code	Unit	Syllabus for semesterized course curriculum	Marks
CC 3.1	Sustainable Development		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Theories, concepts and models of sustainable development</i>	
	2	<i>Agenda 21: Reference guide for sustainable development</i>	
	3	<i>Sustainable land management and wasteland reclamation</i>	
	4	<i>Sustainable use of biodiversity and wild life and its conservation</i>	
	5	<i>Sustainable tourism development</i>	
CC 3.2	Hydrology and Water Resources		50 [40 (exam)+ 10 (internal assessment)]
	1	Sustainable water management and conservation: Recent development in surface and groundwater resources monitoring and assessing processes; Salinity ingress in ground water; Water logging and soil salinity-conjunctive use of surface water and ground water;	
	2	Watershed and floodplain management: Flood and flood plain management; Water-shed management, water harvesting and artificial recharge to ground water; water pollution and water treatment; Environmental issues – River linking debate.	
	3	Wetland and riparian management: Wetland and riparian management; forest management on water resources;	
	4	Sustainable agriculture and forest conservation for water resource management	
	5	Coastal and hill ecology management	
CC 3.3	Atmosphere and Global Climate Scenario		50 [40 (exam)+ 10 (internal assessment)]
	1	Earth systems: Atmosphere, Hydrosphere, Lithosphere, Biosphere and their linkage; Gaia hypothesis; Role of oceans and forests as carbon sinks;	
	2	Earth's atmosphere: Atmosphere and climate. Basic atmospheric properties, climatic controls; Climatic classifications and variability. Movement in the atmosphere: global scale, regional scale, local scale; Wind, stability and turbulence; Monsoons; Dynamic nature of Earth's atmosphere, Global energy balance – source, transfer, distribution, Energy balance of the atmosphere, Variability in turns of the global energy balance;	
	3	Oceans: General circulation patterns; Air – sea interaction; El Nino, Southern oscillations, Cyclones.	
	4	Human impacts on climate: Causes and consequences of global warming – greenhouse effect, global and regional trends in greenhouse gas emissions, sea level rise; Ozone depletion- stratospheric ozone shield; Ozone hole.	
	5	Climate change: Elements of the climate; Human impacts on climate initiative policies; Records of climate change (glacial cycles, ocean sediments, corals, tree rings); Impacts of Climate change – Effects on organisms including humans; Effects on ecosystems and productivity; Species distribution ranges; Spread of diseases; Extinction risk for temperature-sensitive species; UV effects; Climate change and policies – Montreal Protocol, Kyoto Protocol, Carbon trading, Clean development mechanisms.	
CEC 3.	Environmental Management I		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Environment, ecology and management, positive and negative effects</i>	
	2	<i>Human impact on natural environment</i>	
	3	<i>Population and ecological crisis</i>	
	4	<i>Management of forest resource</i>	
	5	<i>Management of mineral resource</i>	
CEC 3.	Environmental Management II		50

	1	<i>Environmental impact assessment:</i> Concept & scope of EIA, principle and salient features, EIA processes, methodologies, MOEF guidelines,	[40 (exam)+ 10 (internal assessment)]
	2	<i>Basic steps of overall appraisal of development projects:</i> base line data collection & generation from the field	
	3	<i>Environmental audit</i>	
	4	<i>Evaluation of environmental impact:</i> Different methods (checklist, adhoc, overlays, matrix, network and Bettle Environmental Evaluation Systems); Environmental impact statement; post project monitoring; Instrumentation technique & micro-meteorological study; DPR for core and buffer zone.	
	5	<i>Environmental Management plan (EMP) and Environmental Audit:</i> Preparation for mitigation; System; some case studies of EIA/EMP and environmental auditing system.	
CEC 3.1A	Man and Environment I		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Environmental education and environmental literacy</i>	
	2	<i>Fundamentals of mass communication</i>	
	3	<i>Basics of science & technology (S&T) communication</i>	
	4	<i>Environmental communication</i>	
	5	<i>Educating consumers</i>	
CEC 3.2A	Man and Environment II		50 [40 (exam)+ 10 (internal assessment)]
	U1	<i>Environmental and resource economics</i>	
	U2	<i>Cost-Benefit Analysis and valuation</i>	
	U3	<i>Non-renewable resources</i>	
	U4	<i>Waste management & renewable resources</i>	
	U5	<i>Pollution control, growth, resources and the environment</i>	

Semester IV

Course code	Unit	Syllabus for semesterized course curriculum	Marks
CC 4.1	Dissertation (Report + Viva)		50 [40 (exam)+ 10 (internal assessment)]
CEC 4.1	Environmental Management III		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Pollution and global environmental issues</i>	
	2	<i>Management of environment I:</i> approaches, components and objectives	
	3	<i>Management of environment II:</i> ISO 14001 Standards for designing and implementation of Environment Management System (EMS), assessment issues;	
	4	<i>Total quality management</i>	
	5	<i>Environmental problems, planning and management in India</i>	
CEC 4.2	Environmental Management IV		50 [40 (exam)+ 10 (internal assessment)]
	1	Toxicology: Principles of toxicology, Types of toxic substances - degradable and non-degradable; Influence of ecological factors on the effects of toxicity; Toxic substances in the environment, their sources and entry roots, Eco-system influence on the fate and transport of toxicants; Transport of toxicants by air and water; Transport through food chain - bio-transformation and bio-magnification. Routes of toxicants to human body – entry through inhalation, skin absorption, indigestion and injection; Response to toxin exposures – Dose response, Lethal and sub-lethal doses; Dose-Response relationships between chemical and biological reactions. Analysis of LD 50, LC 50; Detoxification in human body - detoxification mechanisms.	
	2	Environmental biotechnology: Concept and broad outlines of various application areas – waste treatment, biodegradation of xenobiotic compounds, Recombinant DNA technology & its application in strain improvement hydrocarbon degradation, biofuel production, biofertilizer; GM Crops and GMO: Environmental Implications biopesticides production, and bioleaching. Biocomposting: – Microbial process involvement, vermin composting. Biomining: Extraction of Cu, Au, etc from Ore by microbes, Biomethanation: Agro industrial wastes	
	3	Bioremediation: Concept, role of bioremediation in controlling various pollution problems – solid water, sewage water, industrial effluents, heavy metals, radioactive substances, oil spillage. Phytoremediation: Abatement of different types of pollution using plants, types of phytoremediation, mechanism involved with case studies.	
	4	Alternate fuels: Source and mechanism of various biofuel production.	
	5	Integrated pest management: Concept, technology involved in agriculture & forestry, Biopesticides application potential.	
CEC 4.1A	Man and Environment III		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>The relationship between ‘development’, ‘progress’, science, capitalism and industrialism</i>	
	2	<i>Green critiques of industrialism</i>	
	3	<i>Post-colonial and post-structuralist critiques of development and the discourse of participation</i>	
	4	<i>The impact of development on marginal peoples</i>	

	5	<i>Re-evaluation of development in light of sustainability and social equity; contemporary critiques and models</i>	
CEC 4.2A	Man and Environment IV		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Environmental philosophy</i>	
	2	<i>Theories of environmental ethics and philosophy</i>	
	3	<i>Eco centric theories of nature</i>	
	4	<i>Environmental ethics and issues of national and international governance</i>	
	5	<i>Equitable utilization of resources</i>	
OEC 4.1	Disaster Management I		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Disaster: definition, classification and threat</i>	
	2	<i>Response to disaster impact:</i> disaster induced displacement; Response to disaster impact	
	3	<i>Disaster prevention and mitigation:</i> Major factors prior to disaster impact; National disaster management policy with disaster legislation	
	4	<i>Management of disasters:</i> Disaster management cycle, Mapping of disaster-prone areas, counter disaster plans; Safety measures for natural disasters	
	5	<i>Cyclones and fire-mediated disaster management</i>	
OEC 4.2	Disaster Management II		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Flood and land slide management</i>	
	2	<i>Earthquake and tsunami management</i>	
	3	<i>Anthropogenic disaster management:</i> Man-made disaster, Industrial and chemical disasters; Safety measures and HAZOP study	
	4	<i>Disaster due to volcano, avalanche, drought and global warming:</i> causes, effect and management	
	5	<i>Radioactive and nuclear disaster management</i>	
OEC 4.1A	Museum and Environment I		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Humidity and temperature measurement and control</i>	
	2	<i>Light intensity measurement and control</i>	
	3	<i>Pesticide fumigation</i>	
	4	<i>Air pollution monitoring</i>	
	5	<i>Moisture control and monitoring</i>	
OEC 4.2A	Museum and Environment II		50 [40 (exam)+ 10 (internal assessment)]
	1	<i>Different forms of environmental degradation</i>	
	2	<i>Corrosion, its effects and remedial action</i>	
	3	<i>Salt action and moisture attack and remedial action</i>	
	4	<i>Termite attack and remedies</i>	
	5	<i>Effect of gaseous pollutants and remedies</i>	