चौधरी महादेव प्रसाद महाविद्यालय
C. M. P. DEGREE COLLEGE
(A Constituent P.G. College, University of Allahabad)
Under the Strengthening Component of DBT Star College Scheme
Website: www.cmpcollege.ac.in

Course Structure: Four Semester Course

Semester – I

Course Code	Marks	Course Title	Credits
ENV 501	100	Application of Bio statistics in Environmental Science	3
ENV 502	100	Fundamentals of Environmental Chemistry & Chemical analysis	3
ENV503	100	Biophysics for Environmental Sciences	3
ENV 504	100	General Ecology and Environmental Biology	3

Semester – II

Course Code	Marks	Course Title	Credits
ENV 505	100	Natural Resources & Management	3
ENV 506	100	Environmental Geo-science & Disaster management	3
ENV 507	100	Methodology & Instrumentation for Environmental analysis & monitoring	3
ENV 508	100	Eco- Planning & Sustainable Development	3

Semester – III

Course Code	Marks	Course Title	Credits
ENV601	100	Environmental Pollution & Control	3
ENV602	100	Environmental Impact Assessment	3
ENV603	100	Environmental Law & Management	3
ENV604	100	Waste Monitoring & Management	3

Semester – IV

Course Code	Marks	Course Title	Credits
ENV605	100	Environmental Health & Toxicology	3
ENV606	100	Geographical Information System & Remote Sensing	3
ENV607	100	Forest & Wildlife conservation	3
ENV608	100	Dissertation/Thesis	8
Course Code	Marks	Elective*	Credits
ENV651*	100	Environmental Microbiology & Bio-remedial Technology	3
ENV652*	100	Water and Waste water treatment Processes	3

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Course Outcomes Master of Science Environmental Science

Semester – I

Paper I: Application of Bio statistics in Environmental Science

CO 1: Understand the basic statistical concepts, including measures of central tendency, variability, probability, and hypothesis testing.

CO 2: Understand the importance of biostatistics in designing experiments, analyzing environmental data, and making informed decisions in environmental science.

CO 3: Students should be capable of collecting and managing environmental data, including data on air quality, water quality, biodiversity, and ecological variables.

CO 4: Apply Descriptive Statistics: Students should be able to use descriptive statistics to summarize and present environmental data effectively, including creating graphs and tables.

Paper II: Fundamentals of Environmental Chemistry & Chemical analysis

CO 1: Understand the principles of environmental chemistry, including chemical reactions, thermodynamics, and kinetics as they relate to environmental processes.

CO 2: Understand the common environmental pollutants, such as heavy metals, organic compounds, and nutrients, and understand their sources and impacts on ecosystems and human health.

CO 3: Understand the proficient in explaining chemical equilibrium and its relevance to environmental systems, including acid-base equilibria and redox reactions.

CO 4: Understand the transport and fate of chemicals in the environment, including processes like diffusion, advection, and dispersion.

CO 5: Students should be capable of performing basic chemical analyses commonly used in environmental science, such as titrations, spectrophotometry, and chromatography.

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Paper III: Biophysics for Environmental Sciences

CO 1: Understand the fundamental concepts and principles of biophysics, including molecular interactions, energy transfer, and structural biology.

CO 2: Understand the relevance of biophysics in the context of environmental science, particularly in understanding biological and physical interactions in the environment.

CO 3: Understand the biological molecules are involved in environmental processes such as nutrient cycling, decomposition, and pollutant degradation.

CO 4: Understand the Analyze the flow of energy through ecosystems, including primary production, trophic interactions, and the transfer of solar energy to biological systems.

Paper IV: General Ecology and Environmental Biology

CO 1: Understand the fundamental principles of ecology, including ecological levels of organization, energy flow, nutrient cycling, and population dynamics.

CO 2: Understand the structure and function of ecosystems, including the roles of producers, consumers, decomposers, and the flow of energy and materials within ecosystems.

CO 3: Understand the concept of biodiversity, including its importance for ecosystem stability, resilience, and human well-being.

CO 4: Understand the interactions among species in ecological communities, including competition, predation, mutualism, and coexistence.

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Semester – II

Paper I: Natural Resources & Management

CO 1: Understanding of natural resources, including their types, distribution, and significance to human societies and the environment.

CO 2: Understand the principles of sustainability and their application to the management of natural resources, including the concept of sustainable development.

CO 3: Understand the methods for assessing and quantifying natural resources, including geological surveys, ecological assessments, and hydrological studies.

CO 4: Understand the economic principles governing natural resource allocation, including supply and demand dynamics, cost-benefit analysis, and market forces.

CO 5: Understand the strategies and techniques for conserving and preserving natural resources to ensure their availability for future generations.

Paper II: Environmental Geo-science & Disaster management

CO 1: Understand the comprehensive understanding of environmental geoscience, including the study of geological processes, landforms, and their impact on the environment.

CO 2: Identify and assess geological hazards, such as earthquakes, volcanic eruptions, landslides, tsunamis, and ground subsidence, and understand their causes and consequences.

CO 3: Understand the techniques for assessing and mapping geological hazards and their associated risks to human populations, infrastructure, and ecosystems.

CO 4: Understand national and international policies, regulations, and frameworks related to disaster management and response.

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Paper III: Methodology & Instrumentation for Environmental analysis & monitoring

CO 1: Familiarity with a variety of instruments and equipment used for environmental analysis and monitoring, including spectroscopy, chromatography, sensors, and data loggers.

CO 2: Learn to develop and adapt analytical methods suitable for different environmental samples and parameters, considering factors like sensitivity, selectivity, and precision.

CO 3: Understand the range of analytical techniques, such as spectrophotometry, chromatography, titration, and electrochemical analysis, and understand their applications in environmental analysis

CO 4: Understand the analytical techniques to assess the impact of environmental pollutants and contaminants on ecosystems, human health, and regulatory compliance.

Paper IV: Eco- Planning & Sustainable Development

CO 1: Develop a deep understanding of the concept of sustainability, encompassing environmental, economic, and social dimensions.

CO 2: Understand a solid foundation in eco-planning principles, including land use, resource management, and urban design.

CO 3: Understand the techniques for assessing the environmental impacts of development projects and land use planning decisions.

CO 4: Understand the Collaborate with professionals from various disciplines, such as urban planning, ecology, and social sciences, to develop holistic sustainable development solutions.

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Semester – III

Paper I: Environmental Pollution & Control

CO 1: Identify and classify various sources and types of environmental pollution, including air pollution, water pollution, soil pollution, and noise pollution.

CO 2: Understand the techniques for monitoring and assessing pollutant levels in different environmental media, including air, water, and soil.

CO 3: Understand the ecological, human health, and economic consequences of pollution on ecosystems and communities.

CO 4: Understand the strategies and technologies for preventing and controlling pollution at its source, such as emission controls and waste management practices.

Paper II: Environmental Impact Assessment

CO 1: Understanding of the principles, purpose, and importance of Environmental Impact Assessment (EIA) in sustainable development.

CO 2: Understand the legal and regulatory frameworks governing EIA processes at local, national, and international levels.

CO 3: Understand the effective methods for engaging stakeholders, including local communities, government agencies, and project proponents, in the EIA process.

CO 4: Understand the initial stages of EIA, including project screening to determine if an EIA is required and scoping to identify potential environmental impacts.

CO 5: Understand the predict and assess potential environmental impacts, both positive and negative, resulting from development activities.

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Paper III: Environmental Law & Management

CO 1: Understanding of environmental laws and regulations at local, national, and international levels.

CO 2: Understand the legal frameworks governing environmental protection, including statutes, treaties, and administrative regulations.

CO 3: Understand the requirements and procedures for achieving compliance with environmental laws and regulations.

CO 4: Understand the legal requirements and processes for conducting Environmental Impact Assessments (EIAs) and obtaining permits for development projects.

CO 5: Understand the development and implementation of Environmental Management Systems (EMS) to achieve continuous environmental improvement.

Paper IV: Waste Monitoring & Management

CO 1: Understand the classification of waste materials, including hazardous, non-hazardous, municipal, industrial, and electronic waste.

CO 2: Understand the factors contributing to waste generation, including population growth, industrial processes, and consumption patterns.

CO 3: Understand the different waste collection systems, such as curbside pickup, recycling centers, and drop-off locations, and their efficiency.

CO 4: Understand the emerging technologies and innovations in waste management, such as smart waste systems and circular economy practices.

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Semester – IV

Paper I: Environmental Health & Toxicology

CO 1: Understanding of the field of environmental health, including its scope, importance, and relevance to public health.

CO 2: Understand the environmental factors, including air and water quality, toxic chemicals, and hazardous substances, that can impact human health.

CO 3: Understand the fundamental principles of toxicology, including dose-response relationships, exposure routes, and mechanisms of toxicity.

CO 4: Understand the processes of absorption, distribution, metabolism, and excretion (ADME) of toxic substances in the body, as well as their mechanisms of action.

Paper II: Geographical Information System & Remote Sensing

CO 1: Develop a solid understanding of the principles, concepts, and applications of Geographic Information Systems (GIS) and Remote Sensing (RS).

CO 2: Understand the acquire and collect geospatial data from various sources, including satellite imagery, aerial photography, and field surveys.

CO 3: Understand the Gain proficiency in organizing, storing, and managing geospatial data in GIS databases and remote sensing archives.

CO 4: Understand the methods for integrating different types of geospatial data from multiple sources to create comprehensive spatial databases.

CO 5: Understand the application of GIS and remote sensing to monitor environmental changes, including deforestation, urban expansion, and climate impacts.

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Paper III: Forest & Wildlife conservation

CO 1: Understanding the forest ecosystems, including their biodiversity, structure, and ecological processes.

CO 2: Understand the wildlife ecology, behavior, and habitat requirements in different ecosystems.

CO 3: Understand the principles and techniques for sustainable forest management, including timber harvesting, regeneration, and silviculture.

CO 4: Understand the principles of conservation biology and the importance of genetic diversity in wildlife populations.

CO 5: Understand the various threats to forests and wildlife, including habitat loss, fragmentation, invasive species, pollution, and climate change.

Paper IV: Dissertation/Thesis

CO 1: Develop the ability to design a research study that addresses a specific research question or problem.

CO 2: Formulate a clear and well-structured research proposal that outlines the research objectives, methodology, and expected outcomes.

CO 3: Understand and adhere to ethical guidelines for research involving human subjects, animals, or sensitive data.

CO 4: Choose appropriate data collection methods, instruments, and techniques for gathering relevant data.

CO 5: Develop critical thinking skills to evaluate and interpret research findings within the context of existing knowledge.