MSc Environmental Studies
(Conservation Practice)
COURSEWORK

Coursework

First Semester

Course	Credits	Course Name	Faculty
	3	Natural History and Basic Ecology	G. Ravikanth, Seshadri K.S., Aravind N.A.
	2	Fundamentals of Environmental Science	Priyanka Jamwal, Shrinivas Badiger, Ashish Kumar, Manan Bhan
	2	Economics	Vinay Sankar
	2	Sociology	Siddhartha Krishnan, Saloni Bhatia
	2	Conservation Issues, Ethics and Concerns	Saloni Bhatia, Siddhartha Krishnan, Sharachchandra Lele
	2	Research and Publication Ethics	Seshadri K.S., Obaiah B., Siddhartha Krishnan, Sailendra Dewan, Vinay Sankar, Asmita Sengupta
	2	Communicating Science	Karthik Ram, Jaya Peter
	1	Basic Mathematics	Asmita Sengupta
	1	Basic English	Karthik Ram

Second Semester

Course	Credits	Course Name	Faculty
	2	Remote Sensing and GIS	Manan Bhan, Milind Bunyan, Dipanwita Dutta
	2	Food Systems	Gurmeet Singh
	2	Biodiversity and Ecosystem Services	T. Ganesh, Aravind N.A., Abdul Kareem, G. Ravikanth, Asmita Sengupta, Seshadri K.S., R. Ganesan
	2	Introduction to Climate Change	Shrinivas Badiger, Sachin Tiwale, Vinay Sankar, Priyanka Jamwal
	2	Water Resources	Ashish Kumar, Priyanka Jamwal, Sachin Tiwale
	3	Advance Research Methods	Siddappa Setty R., Vinay Sankar, Seshadri K.S., Asmita Sengupta
	2	Practising Interdisciplinary Research on the Environment	Sharachchandra Lele, Shrinivas Badiger, Saloni Bhatia, Vinay Sankar, Sachin Tiwale, Siddhartha Krishnan

 FOUNDATIONS

 PERSPECTIVES

 DOMAIN SKILLS

 DOMAIN KNOWLEDGE

 ELECTIVES

Third Semester

Course	Credits	Course Name	Faculty
	2	Project Cycle Management	Sarala Khaling, Shrinivas Badiger
	2	Conservation & Environment Policy	Sharachchandra Lele, Gautam Aredath, Anuja Date
	2	Conservation Psychology	V.V. Binoy, Abdul Kareem
	2	Impact Assessment	Gautam Aredath, Sachin P.S.
	2	Cultural Diversity & Traditional Knowledge	Abdul Kareem, Unni Krishnan
	1	Design Thinking	Shyam Sundar
	2	Field Immersion	

Fourth Semester

Course	Credits	Course Name	Faculty
	35	Master's Thesis or Internship	

Electives (Tentative)

Course	Credits	Course Name	Faculty
	2	Conservation Technologies	Shiv Subramanya, Shrinivas Badiger, Abhijith Kumar
	2	Human-Wildlife Interactions	Asmita Sengupta, Saloni Bhatia
	2	Ecological Restoration	Rajkamal Goswami, Abi Tamim Vanak, Priyanka Jamwal, Anuja Malhotra
	2	Impact Assessment	Gautam Aredath
	2	Enterprise-based Conservation	Siddappa Setty R., Harisha R.P.
	2	Urban Ecology, Design and Practice for Sustainability	Soubadra Devy, Seshadri K.S., Asmita Sengupta, Jaya Peter, Siddhartha Krishnan
	2	Approaches to Conservation	Siddappa Setty R., Aravind N.A.

FOUNDATIONS PERSPECTIVES DOMAIN SKILLS DOMAIN KNOWLEDGE ELECTIVES

FULL COURSE SYLLABUS

FIRST SEMESTER

1. ***Natural History and Basic Ecology (3 credits)***
   This course is designed primarily for students without prior training in natural history and ecology. It serves as an introductory, full-semester core course that covers basic natural history and ecological principles. Despite the significant advancements in experimental and theoretical approaches within modern ecology, natural history remains a crucial foundation for ecological research. It aids ecologists in developing hypotheses and designing experiments that are relevant to the natural world. Many ecological questions and patterns can only be fully understood and appreciated through detailed natural history observations.

   Faculty: G. Ravikanth, Seshadri K.S., Aravind N.A.

2. ***Fundamentals of Environmental Science (2 credits)***
   This course will introduce the fundamentals of environmental processes at the global, regional and local scales using a biogeochemical framework. Apart from lectures on theory, the course will help students apply the concepts learnt to real-world environmental problems. Students will learn by doing field, laboratory and computer exercises in environmental sciences. The theory portion will focus on carbon, water and nitrogen cycles. Concepts of stocks, fluxes, and positive and negative feedback mechanisms will be discussed for each biogeochemical cycle at various spatial scales. These concepts will be presented in the context of major environmental challenges facing us, including water resources, energy consumption, air and water pollution and soil degradation. Concepts related to assessing risk to human health following exposure to contaminants will also be covered. The course will explore topics in sustainability science in relation to the anthropogenic transformation of environmental processes using a variety of thematic lenses: resources (water, air and energy), production sectors (agricultural and industrial systems) and environmental problems (air pollution, water pollution and climate change).

   Faculty: Priyanka Jamwal, Shrinivas Badiger, Ashish Kumar, Manan Bhan

3. ***Economics for Environment and Development (2 credits)***
   Basic principles of economics; key concepts in environmental economics; key concepts in development economics; major tenets of political economic analysis. The outcomes of this course: the evolution of economic thought; an understanding of microeconomic concepts; decision making of economic agents; ecological economics and neoclassical economics; critical assessment of research and debate in the application of economic theories and tools in environment and development

   Faculty: Vinay Sankar

4. ***Sociology (2 credits)***
   This course trains students to use sociological imagination to 1. Locate their environment and development thoughts and actions within wider political, economic and cultural structures, and 2. Understand the experiences of other rural and urban communities they study in a similar manner. In doing so, students get to engage with the stratified nature of traditional Indian society, its encounter with modernity, and how class, caste and gender locations condition societal experience of environmental goods and bads.

   Faculty: Siddhartha Krishnan, Saloni Bhatia, Kiren Asher, Rinzi Lama

5. ***Conservation Issues, Ethics, and Concerns (2 credits)***
Conservation is an important part of the environmental debate today. It is also the prime focus of this master's programme. This course investigates the history, definition, scope, values and ethics underpinning the term, explores its relationship with other environmental concerns, the relationship of environmentalism with other societal goals and the challenges of effective environmental conservation in democratic societies. At the end of the course, students should be able to describe the different cultural conceptions of what is to be conserved and why and coherently articulate the challenges to effective and ethical conservation in a democracy.

Faculty: Saloni Bhatia, Siddhartha Krishnan, Sharachchandra Lele

6. ***Research and Publication Ethics (2 credits)***
This course is divided into two parts: 1. An introduction to the philosophy of science and 2. The ethics of conducting and publishing scientific research. Students will also be taught several soft skills, including learning authorship protocols, conducting and responding to peer review, and developing data archival strategies. Through a series of hands-on sessions, students will learn to find appropriate journals for publishing their work, develop and maintain bibliographies, obtain research ethics clearance and conduct a plagiarism check.

Faculty: Seshadri K.S., Obaiah B., Siddhartha Krishnan, Sailendra Dewan, Vinay Sankar, Asmita Sengupta

7. ***Communicating Science (2 credits)***
To communicate your research effectively to various stakeholders – non-academic and academic. The outcomes of this course are to understand the process of writing; write clearly and concisely; organise an essay meaningfully; understand the history and philosophy of research communication; survey relevant literature; understand the structure of a research paper; comprehend the process of peer review; learn about other forms of research communication, including research posters, research talks and grant proposals; tailor a communication strategy for different audiences; understand the varied audiences and the tools needed to communicate effectively; summarise concepts and create a pitch; and practice the art of storytelling with words and visuals.

Faculty: Karthik Ram, Jaya Peter

8. ***Basic Mathematics (1 credit)***
The goal of this course is to provide an overview of the fundamentals of mathematics needed to understand concepts of relevance in the realm of environmental, social and ecological sciences.

Faculty: Asmita Sengupta

9. ***Basic English (1 credit)***
The basics of English grammar and style while learning how to apply these skills to critical reading and writing in the context of conservation and science.

Faculty: Karthik Ram

FULL COURSE SYLLABUS

SECOND SEMESTER

1. ***Remote Sensing and Geographic Information System (GIS) of the Environment (2 credits)***

   This course will provide a basic introduction to the concepts of landscape ecology and practical applications of Geographical Information Systems (GIS) and satellite remote sensing (RS) for environmental applications, with a special focus on the remote sensing of vegetation and land cover. Students will gain a basic understanding of the theoretical basis for temporal and spatial scale issues, data collection and analysis, and an overview of the approaches used to interpret these data for understanding the drivers, processes and outcomes of ecological and environmental changes in different contexts.

   Faculty: Manan Bhan, Milind Bunyan, Dipanwita Dutta

2. ***Food Systems (2 credits)***

   This course will present some of the key conservation and sustainability challenges arising from food and the societal and technological solutions pursued to address them.

   The course will begin with a holistic exploration of what food means to humans and how this has evolved in the context of our biological and cultural evolution. It will delve into population-level calculations to understand the basic mass and energy challenges related to food. The sources of food – foraged versus farmed, vegan versus animal, local versus global, whole foods versus supplements – will be discussed and the technology landscape to address these tensions will be presented. The course will examine the importance of local ecosystem resources and associated traditional knowledge in Food System Transformations. Writing actions for Food System Transformations will form a key part of the course. The students will design a 2050 food plate in line with the actions and cook it.

   Faculty: Gurmeet Singh

3. ***Biodiversity and Ecosystem Services (BES) (2 credits)***

   This course will expose students to the importance of ecology in the larger conservation context. It will show how ecology, ecological processes and related ecosystem services help us address conservation issues for the well-being of the planet. The students will be presented with several case studies of conservation programmes and the importance of ecological studies in shaping them.

   The course will essentially be taught both in the classroom and in the field to enable students to appreciate and understand how nature functions and how to use such information in conservation planning.

   Faculty: T. Ganesh, Aravind N.A., Abdul Kareem, Ravikanth, Asmita Sengupta, Seshadri K.S., R. Ganesan

4. ***Introduction to Climate Change (2 credits)***

Basic understanding of weather and climate; climate of India; global and regional atmosphere-ocean phenomena such as ENSO and IOD and its impact on Indian Monsoon. Basic physics of global warming and its change due to anthropogenic activities. Impact of warming and enhanced CO2 on land, water, vegetation and ocean. Implications of climate change on ecosystem services and biodiversity. Fundamentals of climate change adaptation and mitigation.

Faculty: Shrinivas Badiger, Sachin Tiwale, Vinay Sankar, Priyanka Jamwal

5. ***Water Resources (2 credits)***

This course will equip students with the knowledge to 1. Understand surface and groundwater dynamics, addressing water quantity and quality; 2. Comprehend human influences on the hydrological system; and 3. Apply tools, like modelling, to properly integrate hydrological knowledge and analysis in water resources planning and management.

Faculty: Ashish Kumar, Priyanka Jamwal, Sachin Tiwale

6. ***Advanced Research Methods (3 credits)***

The course will introduce and provide hands-on training in essential qualitative, quantitative and participatory methods used in social sciences for applied conservation, environment and development research. Emphasis will be placed on organising and executing research projects and combining methods in field settings. At the end of the course, students should be able to independently develop appropriate methodological protocols to answer questions in applied research on conservation, environment and development; design, organise and execute field-oriented academic research projects requiring a mix of disciplinary approaches and methods; and critically assess social research methods and tools used in research projects and studies. The course will offer an overview of the fundamentals of statistics and their applications in addressing research questions. It will further provide hands-on training in using the R statistical environment.

Faculty: Siddappa Setty R., Vinay Sankar, Seshadri K.S., Asmita Sengupta, Eapsa Berry, Sailendra Dewan

7. ***Practising Interdisciplinary Research on the Environment (2 credits)***

This core course will build on the disciplinary knowledge to which students were exposed in semester 1 and focus on the challenge of linking and integrating this knowledge to study society-environment interactions holistically. The first part of the course will be common to PhD and master's students: It will begin by exploring environmental problems as a special class of social issues, the inherently value-laden nature of such problems, and the need for and challenge of doing rigorous interdisciplinary research in this context. We will briefly review the normative concerns central to the environment-development debate (already covered in CIEC). Finally, and most importantly, it will take students through different (often competing) perspectives on the society-environment relationship. We will end this part with a discussion of the different ways in which frameworks can be translated onto the ground for research and action.

The MSc students will understand how interdisciplinary 'solutions' are crafted, whether for policy or practice, focusing on the normative concerns and merging multiple causal perspectives and solution styles. This learning will be through four case studies of how activists, practitioners or policy advocates have tried to address real-world environmental problems. We will try to bring in guest speakers with hands-on experience in such matters. At the end of this course, MSc students will have learnt how to analyse environmental problems holistically, using different normative and analytical framings, and how to identify approaches for solving these problems.

Faculty: Sharachchandra Lele, Shrinivas Badiger, Saloni Bhatia, Vinay Sankar, Sachin Tiwale, Siddhartha Krishnan

FULL COURSE SYLLABUS

THIRD SEMESTER

1. ***Project Cycle Management (2 credits)***
   This course introduces students to tools and methods that will equip them with skills to write well-designed project proposals required for their post-university years and to upgrade the technical and managerial competencies necessary for project identification, stakeholder management, project design, and the development of monitoring and evaluation systems. It develops skills to foster a learning style encompassing reflection and analysis, pursue broader career opportunities, including non-research pathways, and work in a team with diverse people, cultures and learning styles.

   Faculty: Sarala Khaling, Shrinivas Badiger

2. ***Conservation & Environment Policy (2 credits)***
   This course will introduce key theoretical concepts – why environmental policy/governance is necessary (nature of the resource, nature of societal decision-making) and what its instruments are (legal, fiscal and administrative) – using examples from various sectors. With a special focus on biodiversity and forests, the course will help students understand how to deploy these instruments and how they perform in India. We will also discuss how other state and non-state actors, such as the judiciary and social movements, have shaped environmental policy in India.

   Faculty: Sharachchandra Lele, Gautam Aredath, Anuja Date

3. ***Conservation Psychology (2 credits)***
   This course will introduce the psychological underpinnings of the 'reciprocal relationship between humans and the rest of nature'. The course also includes exploring the possibilities of utilising the principles of psychology to promote behaviours that help ensure sustainability and reduce harm to the environment.

   Faculty: V.V. Binoy, Abdul Kareem, Prantik Das

4. ***Impact Assessment (2 credits)***
   Environmental impact assessment (EIA) refers to a tool for decision-making, a legislative instrument and a formalised management process of the environment. It provides for due diligence relating to the environmental impacts of developmental activities, aiding decision-making on the suitability of development projects and the mitigation of its adverse effects. The objective of this course is to provide students with a working knowledge of the conceptual, regulatory and technical aspects of EIA, particularly as it is practised in India.

   Faculty: Gautam Aredath, Sachin P.S.

5. ***Cultural Diversity & Traditional Knowledge (2 credits)***

   This course explores various perspectives, practices and policies related to traditional knowledge, culture and intangible heritage, emphasising their role in development. The objectives include introducing students to the key concepts of traditional knowledge, examining international and national responses and understanding the contributions of cultural and intangible heritages to grassroots conservation efforts. Additionally, the course will address legal and policy issues concerning culture and traditional knowledge.

   Faculty: Abdul Kareem, Unni Krishnan

6. ***Design Thinking (1 credit)***

   It is a structured approach to identify opportunities, gather information, arrive at resolutions, create innovative solutions, communicate ideas, improve the concepts based on feedback, validate solutions and implement them.

   Faculty: Shyam Sundar

FULL COURSE SYLLABUS

FOURTH SEMESTER

In the final semester, students can undertake a master's thesis and internship, both carrying 35 credits. The master's thesis involves independent research on a chosen topic under faculty supervision, allowing students to develop critical thinking and analytical skills. Alternatively, the internship provides hands-on experience working with organisations involved in conservation, sustainability or environmental management. This semester is designed to equip students with research expertise or practical exposure, preparing them for careers in academia, policy or the environmental sector.

FULL COURSE SYLLABUS

ELECTIVES

(TENTATIVE)

1. ***Conservation Technologies (2 credits)***
   Technology has made the conservation of natural resources easier. From smartphones to satellites, information is now collected and processed in unprecedented quantities and at lower costs. In this course, students will learn about the technologies being used in natural resource conservation, debate and discuss the ethics of deploying these technologies and explore the frontiers of the field. Students will be given hands-on experience in using two open-source platforms that are proven to democratise data collection and improve scientific rigour.

   Faculty: Shiv Subramanya, Shrinivas Badiger, Abhijith Kumar

2. ***Human-wildlife interactions in a rapidly changing world (2 credits)***
   The course will introduce students to the many forms and facets of human-wildlife interaction (HWI). Drawing from the natural and the social sciences – both in terms of theory and practice and through case studies and debates – the course will examine how human-wildlife interactions are shaped across different cultures, contexts and intersectionalities. It will enable students to assess the implications of different kinds of interactions for human lives, animal lives and the ecosystems that we are a part of.

   Faculty: Asmita Sengupta, Saloni Bhatia

3. ***Ecological Restoration (2 credits)***
   This course provides a comprehensive understanding of ecosystem restoration, from theoretical knowledge to practical dimensions. Students will explore restoration ecology principles, methodologies and case studies, including field visits to two restoration project sites.

   Faculty: Rajkamal Goswami, Abi Tamim Vanak, Priyanka Jamwal, Anuja Malhotra

4. ***Enterprise-based conservation, ecology and socio-economics (NTFPs, invasive species and agroforestry) (2 credits)***
   Non-timber forest products (NTFPs) play an important role in maintaining biodiversity and species richness across biodiversity hotspots of tropical forests. A significant number of species are being harvested for fruits, leaves, flowers, barks etc. Understanding safe harvest techniques and monitoring would contribute to the livelihood and conservation of biodiversity.

   The course will focus on enterprise-based conservation models, the ecological, social and economic aspects of NTFPs, invasive species, agroforestry in the Western Ghats and Eastern Himalayas. The course will give an idea of how NTFP studies would contribute and strengthen biodiversity conservation in the context of forest landscape. It will speak about invasive species, related impacts and opportunities and other enterprise-based conservation models.

   The course will consist of four components: 1) History of NTFPs and invasives 2) Livelihood and conservation linkage with NTFPs, invasives and other forest-based enterprises.
   3) Enterprise-based conservation models 4) Current status of NTFP, invasive species like Lantana and policy implications.

   Faculty: Siddappa Setty R., Harisha R.P.

5. ***Urban Ecology, Design, and Practice for Sustainability (2 credits)***
   This course aims to provide a comprehensive exploration of how ecological and social sciences can be integrated into sustainable urban planning and design.

   Faculty: Soubadra Devy, Seshadri K.S., Asmita Sengupta, Jaya Peter, Siddhartha Krishnan

6. ***Approaches to Conservation (2 credits)***
   The course aims to provide insights into practical learning in the context of conservation. It will help students design experiments and learn from them and assess impact.

   Faculty: Siddappa Setty R., Aravind N.A.

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