



Ph.D. (Conservation Science) - Coursework

Course: Natural History and Basic Ecology

Credit: 3

Objectives: This introductory, full-semester core course will introduce students to basic natural history and ecological principles, emphasizing their application. While modern ecology has seen significant advancements in experimental and theoretical approaches, natural history remains an essential foundation for ecological research. It helps ecologists develop hypotheses and design experiments that are relevant to the natural world. Furthermore, many ecological questions and patterns can only be fully understood and appreciated through detailed natural history observations.

This 3-credit course deals with studies related to observation, documentation, and study of organisms and their interactions with their environment in their natural settings. Students will also learn basic ecological concepts at levels of the population, community and ecosystem: the relationship between organisms and their environment, interactions amongst organisms; patterns in the distribution of species and communities; and processes that underlie the functioning of ecosystems.

The course will also draw upon case studies to illustrate the application of ecological concepts to conservation practice and sustainable use of bioresources. The course will present different perspectives and debates around topical issues such as fire management, human-wildlife conflicts, invasive species management, conservation models, etc. Policy and conservation challenges around these topical issues would also be discussed.

Course: Sociology for Conservation and Sustainability

Credits: 3

Objectives: This course trains students to use the sociological perspectives to not only locate their conservation and development thoughts and actions in wider political, economic, and cultural structures, but also those of conservation and sustainability stakeholders in general. Students get to discuss the stratified nature of traditional Indian society and its encounter with modernity.

The course imparts foundational and critical knowledge in classical and contemporary sociology. Students will be introduced to contemporary, postmodern, post-structural – sociology's power and gender engagements, including Indian sociologies of gender. Subsequently, they will be exposed to Indian sociological work on caste, class and their interfaces. Across all the modules, theorizing on conservation and environmentalism appears in relational or linked ways. The course seeks to inoculate the conservation or sustainability



academic or practitioner with sociological sensibilities and sensitivities. These will also make themselves felt in the final assignment that students will undertake. The assignment fulfills the performative aspect of this course.

Course: Basic Maths

Credits: 1

Objectives: The goal of this course is to provide an overview of the fundamentals of mathematics needed to understand quantitative methods used in environmental, social and ecological sciences. Classes will combine lectures on mathematical concepts and practice sessions.

Course: Environmental Economics

Credits: 3

Objectives: The contemporary world is facing challenges of overexploitation and degradation of resources and the environment which is often linked to economic growth. Environmental economics helps countries and states to develop environmental policies which can help in achieving sustainable development. Through this course, students will gain a foundational understanding of environmental economics, and its real-life use and applications.

Environmental Science

Course: Credits: 3

Objectives: This course will introduce the fundamentals of environmental processes at global, regional and local scales using a biogeochemical framework. Apart from lectures on theory, the course will help students apply the concepts learned to real-world environmental problems.

Students will learn by doing field, laboratory and computer exercises in environmental sciences. The theory portion of the course will focus on carbon, nitrogen and water and cycles. Concepts of stocks, fluxes, and positive and negative feed-back 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, agriculture, pollution, soil degradation, and climate change.

The course will explore then topics in sustainability science in relation to the anthropogenic transformation of environmental processes using a variety of thematic lenses: resources (water), production sectors (agricultural systems), and environmental problems (climate change and water pollution).

**Course: Communicating Science****Credit: 1**

Objectives: This course will provide students with various tools for effective scientific communication and the processes used in developing a communication plan.

Course: Research Publication and Ethics**Credit: 2**

Objectives: This course is divided into two parts—the first provides students with an introduction to the philosophy of science and the second, the ethics of conducting and publishing scientific research. Beginning at an introduction to the philosophy of science, students will be introduced to the background, ethics, debates and pitfalls of publishing science. Students will also be taught a number of 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 also learn to find appropriate journals for publishing their work, develop and maintain bibliographies, obtain research ethics clearance and conduct a plagiarism check.

Course: Qualitative Methods**Credit: 1**

Course Objectives: The course will introduce and provide hands on training of the essential qualitative, quantitative and participatory methods used in social sciences for applied conservation, environment and development research. Emphasis will be placed on organizing and executing research projects and combining methods in field settings.

At the end of the course, the students should be able to independently develop appropriate methodological protocols to answer questions in applied research on conservation, environment and development. Design, organize and execute field oriented academic research projects requiring a mix of disciplinary approaches and methods, as well as critically assess social research methods and tools used in research projects and studies.

Course: Quantitative Methods**Credit: 2**

Objectives: This course will consider and present statistics as an integral part of the scientific process rather than as an afterthought. It will use R statistical software for conducting statistical analyses and generating coherent outputs. Examples and applications will be drawn from both the social and natural sciences.

Course: Natural Science Methods**Credit: 1.5**

Objectives: The course is intended to acquaint students with the basic methods commonly employed by natural scientists. The course will begin with lectures on the theoretical concepts



underpinning each type of sampling and when to use it, followed by a 12-day field component. Outcomes The course is expected to build the capacity of students to develop, design, and implement research projects in ecology. The students will develop small research projects, implement them in the field, write a paper, and present their findings with a clear hypothesis, rationale, sampling design, methodology, analysis, results, and conclusion that is of publishing standard.

Course: Interdisciplinary Perspectives and Case Studies (C3)

Credits: 3

Objectives: This core course is meant to help students understand how to carry out interdisciplinary research on the environment. It will build on the disciplinary knowledge to which students were exposed in semester 1 and focuses 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 students: It will begin by exploring the nature of environmental problems as a special class of social problems, of the inherently value-laden nature of such problems, and the need for and challenge of doing rigorous interdisciplinary but rigorous research in this context. It then will explore the specific normative ideas that are central to the environment-development debate. Finally, it will take students through different (often competing) perspectives on the society-environment relationship.

In the second part of the course, we will follow different tracks for the PhD and the Masters students: The PhD students will focus on understanding how interdisciplinary research projects/dissertations have sought to frame and conduct such research with a series of examples that have used one or more of these perspectives to frame and analyse a particular environmental problem. Attention will be paid to understanding the normative, theoretical, and methodological choices made in the studies, including specifically the interdisciplinary linkages and the within-disciplinary choices and modifications. At the end of such a course, the PhD student is expected to understand how the framing of their research problem involves normative and theoretical choices, be in a position to frame and flesh out an interdisciplinary research programme on the environment, and to understand the place of their research (now and future) in the wider action-research-policy context.