

IISER Pune - Course Content

Semester	AUG 2025
Open to Semester	7,11,13,21,9
Course Code	SE4123
Course title	Science and the world
Nature of Course	LE - Lecture
Credit	3
Coordinator and participating faculty (if any)	Dr. Bhas Bapat Dr. Anirban Hazra Dr. Aparna Deshpande
Pre-requisites	None
Objectives	<p>Science is a compulsory subject in school in India, although very few students pursue science beyond school and an even smaller number use science concepts in their professions. In light of this, designing a science curriculum that caters to a wide variety of students and makes them scientifically literate is a challenging and important question.</p> <p>The objective of this course is to create science educators who can critically engage with science curriculum by having an understanding of the interaction of science with the world. More specifically, the course aims to:</p> <p>(a) Understand the nature of scientific knowledge, the social factors that lead to the development of scientific knowledge, and how this knowledge in turn affects society.</p> <p>(b) Familiarise students with the process of science, in contrast to presenting science as a finished product that contains a set of scientific theories and concepts.</p>
Course content	<p>In the first part of the course we will discuss questions such as (i) Why does a person interested in science education need to understand the Nature of Science? (ii) What exactly is meant by the Nature of Science? (iii) What is the method of science and the role of imagination in Science, and connectedness of topics in Science.</p> <p>In the second part we will study how science developed historically, as a human and cultural endeavour to describe Nature. We will look at early attempts of humans to understand nature, and activities such as agriculture, in the early times and sea-faring and manufacturing later on, which drove intellectual pursuits aimed at understanding natural phenomena and using them for the benefit of mankind. We will also look at how the political milieu,</p>

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	<p>governmental and societal conditions influenced the growth of science.</p> <p>After this we will take up three case studies to examine the relationship between Science and the World.</p> <ol style="list-style-type: none"> 1. Industrial production of ammonia 2. Electromagnetic Radiation 3. Climate Change <p>Each case study will be anchored around the following points.</p> <ol style="list-style-type: none"> 1. The progression of academic or scientific ideas that led to the discovery. 2. Prevalent social, economic and political conditions which might have influenced or engendered the invention or the discovery. 3. Technological developments which led to widespread application and implementation of the ideas. 4. Social political and economic changes brought about by adoption of the technology or the applications of the discovery or invention. The need to re-examine or refine the scientific wisdom that led to the idea, forced by the implementation of the technology or the idea. <p>Lectures</p> <p>4 Lectures for the first part 4 Lectures for the second part 6 lectures per case study. 2 lectures for summary and closing remarks.</p>
Evaluation / Assessment	<p>40% EndSem (written) 30% MidSem (written) 30% A multi-part assignment</p>
Suggested readings	<ol style="list-style-type: none"> 1. Science in History, by J D Bernal (vols 1, 2) 2. Enriching the Earth, by Vaclav Smil 3. The Discovery of global Warming, by Spencer Weart 4. The Warming papers, Edited by David Archer and Raymond Pierrehumbert 5. Faraday, Maxwell, and the Electromagnetic Field: How Two Men Revolutionized Physics by Nancy Forbes and Basil Mahon <p>In addition there will be a few papers on Nature of Science as well as the case studies.</p>
When Next	2026 August

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