

Title	Scientific method: the fundamental concepts
Teacher	Prof. Edoardo Datteri (University of Milano-Bicocca) Prof. Raffaella Campaner (University of Bologna) Prof. Elisabetta Lalumera (University of Milano-Bicocca) Prof. Federico Laudisa (University of Trento)
Language	English
Short description	<p>To carry out methodologically solid scientific research, one must properly understand and sensibly use fundamental concepts of science, such as the concepts of scientific model, scientific explanation, objectivity, scientific reduction, which typically admit of many possible interpretations and definitions, and give rise to several epistemological controversies. This course represents a unique opportunity, for all the Bicocca PhD students, to reflect on the meaning of these concepts as they are used in science. More specifically, in each lesson,</p> <ol style="list-style-type: none"> 1) some definitions of the target concept will be proposed and critically discussed, with reference to the epistemological literature and to scientific case studies; 2) participants will be invited to reflect on how they use the concept in their field of expertise. <p>The teachers will encourage discussion and active participation. The lessons will be held in English.</p>
Target audience	PhD students from all the courses offered in Bicocca.
CFU	1
Hours	8
Participants (min/max):	5 - 30
Calendar	<p>April 9th 2021, 15:00 – 17:00</p> <p>Prof. Edoardo Datteri (University of Milano-Bicocca)</p> <p>Title of the lesson: Scientific models</p> <p><u>Abstract</u>: Some concrete or abstract entities are used to represent parts of the world (e.g., a DNA helix made of plastic, the Lotka-Volterra model of prey-predator interaction). What makes an entity a model of another entity? Some attempts to define the notion of “scientific model” – namely, the similarity-based, the structural, and the inferential one – will be presented and discussed with examples taken from the scientific literature. In the last part of the lesson, participants will be invited to find examples of models in their scientific research field, and to reflect on whether they satisfy the definitions discussed in the lesson.</p>

April 21st 2021, 15:00 – 17:00

Prof. Raffaella Campaner (University of Bologna)

Title of the lesson: **Scientific explanation**

Abstract: What do we mean when we claim that we are “explaining” the occurrence of an event, or the way in which a phenomenon behaves? What are the distinctive epistemological features of a genuinely explanatory account, and what characteristics tell it from other forms of knowledge? From a theoretical standpoint, any analysis of an explanation needs to start clarifying what the object of the explanation itself (the explanandum) exactly is, what provides the explanatory information (the explanans), and what the specific link relating the explanans and the explanandum is. It is particularly with respect to the third element – i.e. the explanatory relation – that a very large debate has been developing in philosophy of science since roughly the middle of the XX century. The seminar aims to present and discuss some of the most successful positions put forward in such debate, shedding some light on the relations between explanation, description, prediction and intervention on phenomena. The merits and limits will be investigated of explanatory approaches which appeal to: scientific laws / generalizations; causal-mechanistic relations; causal-manipulationist relations; functional relations. Some examples of scientific explanations in different disciplinary fields will bring into focus also the role of contextual elements in the elaboration of explanatory accounts, and the relations between what is taken as the explanation and its ultimate use.

May 7th 2021, 14:00 – 16:00

Prof. Elisabetta Lalumera (University of Milano-Bicocca)

Title of the lesson: **Objectivity**

Abstract: We often take for granted that science is objective, and sometimes objectivity is taken to be the distinguishing feature of scientific knowledge. But what is objectivity? In this class we will examine different approaches at defining what is objectivity in science, including absence of values, reproducibility, awareness of values, and integration of different perspectives. Participants will be invited to compare the approaches discussed with the research practice of their field, and more generally to reflect on the role of values in science and research.

May 21st 2021, 15:00 – 17:00

Prof. Federico Laudisa (University of Trento)

Title of the lesson: **Scientific reduction**

Abstract: In general terms, the idea of reduction has represented one of the most fundamental aims of the scientific enterprise itself. As a consequence, the meaning and role of reduction in the development of scientific knowledge played a crucial role in philosophy of science since the first half of the XXth century. The notion of reduction, however, gave rise more to a general research program than to a specific and well-characterized definition, and there has been no agreement up to recent times about what we should exactly mean with the term ‘reduction’. In the talk I will give a synthetic view of the problem, and I will try to sketch a possibly balanced assessment of the current debate, paying special attention to its epistemological side.