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PhD newsletter

News

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Starting Courses – PHD SCHOOL

PROF. ALIVERTI ANDREA, PROF. HUGHES JONATHAN
ETHICS IN RESEARCH
The aim of the course is to make participants a) fully aware on how scientific and technological research have ethical implications; b) to identify ethical issues in specific research cases and procedures; c) to understand how the adherence to ethics standards is essential not only for respecting ethical values and fundamental rights, but also increase quality and likely impact of research.
From 1st to 28th February 2025 🌍

PROF. CARDILLI LORENZO

EUROPEAN CULTURE

The course will address the issue of how European imagined and represented their relation with technology, with a view to highlighting main epistemological implications of such relationship. The course aims to stimulate ethical and epistemological reflections, and to help PhD students develop critical approaches to their own work. Another aim is to provide PoliMi PhD students (especially to students coming from countries other than European ones, but the course is open to all students) with some essential cornerstones of European Culture, showing how ancient and illustrious myths and characters are constantly being reworked and developed in a striking combination of novelty and continuity.

From 3rd to 24th February 2025

PROF. BOBADILLA RODRIGUEZ HERNAN FELIPE

SCIENTIFIC MODELS: CONCEPTUAL FOUNDATIONS AND PHILOSOPHICAL ISSUES

The course aims at exploring the conceptual foundations of scientific models. Specifically, it deals with philosophical issues concerning the construction and use of models in various scientific disciplines as well as in engineering, architecture and design.

From 27th February to 29th May 2025

PROF. SANCASSANI SUSANNA

TEACHING METHODOLOGIES, STRATEGIES AND STYLES

The main objective is to enable students to create effective course design, consistent assessment strategies and to apply valid classroom management strategies.

From 1st February to 31st March 2025

PROF. MANZONI MARCO, PROF. BROVELLI MARIA ANTONIA, PROF. CUCA BRANKA, PROF. GIANINETTO MARCO, PROF. OXOLI DANIELE

THE COPERNICUS GREEN REVOLUTION FOR SUSTAINABLE DEVELOPMENT

Our planet is undergoing unprecedented climate change, and the Green Deal is the EU's reply to this challenge. Copernicus space data are part of the EU's strategy for sustainable development (SDGs) in Europe towards a more resilient society. However, new problem-solving expertise and soft skills are needed to unlock this European revolution's full potentials. This transdisciplinary doctoral course introduces the next generation of European professionals and researchers to Copernicus potentialities in many different fields. Becoming a leader in new value-added services and products for the citizens is fundamental for building a more green, resilient and inclusive society.

From 3rd February to 9th June 2025

Starting Courses – DOCTORAL PROGRAMMES

PHD IN MATHEMATICAL MODELS AND METHODS IN ENGINEERING

PROF. FRANCESCO BUSCEMI

FROM MAJORIZATION TO THE QUANTUM BLACKWELL THEOREM, WITH APPLICATION IN STATISTICS AND INFORMATION THEORY

The aim of the course is to present the basic ideas of statistical comparison in quantum theory, starting from the classical theory of majorization and the Blackwell-Sherman-Stein theorem, their generalisations to the case of non-commuting operators, and their applications to several cutting-edge research problems in quantum information theory and quantum statistical mechanics.

For problems that lend themselves to statistical interpretation, such as parameter estimation or information transmission, whenever different strategies are possible, it is natural to compare them on the basis of their statistical performance with respect to the problem at hand. The theory of statistical comparison provides a rigorous formalisation of this scenario. The aim of the course is to present the basic ideas of the classical theory, including the theory of majorization and the Blackwell-Sherman-Stein theorem, their generalisations to the case of non-commuting operators, and their applications to several cutting-edge.

The course consists of nine lectures of three hours each. We begin by reviewing the theory of majorization for probability distributions, generalizing it to the case of statistical models, for which we prove the Blackwell-Sherman-Stein theorem. We then consider the special case of statistical dichotomies and tackle the problem of relative majorization. We will then look at applications in classical statistics. We will then move on to the quantum case and introduce/review the basics of quantum theory and quantum estimation, in particular quantum states, quantum statistical models, quantum measurements and quantum channels. We will then define the idea of statistical sufficiency, quantum statistical morphisms, and prove the quantum version of Blackwell's Theorem. The course will end with some applications of the theory of quantum statistical comparison in quantum physics and quantum information theory.

From March 7th, 2025 ✉