Università Ca'Foscari Venezia
Ca' Foscari Challenge School
Challenge School of Humanities

MASTER IN PHILOSOPHY AND HISTORY OF SCIENCE AND TECHNOLOGY

LEVEL 1 - FIRST EDITION

A.Y. 2020-2021

The uses of science

Interuniversity program

Ca' Foscari University of Venice and University of Bologna

Description

Scientific literacy, defined as "the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity" (National Academy of Sciences 1996), is a mandatory task to undertake in contemporary 'knowledge societies'. Literacy does not only entail technical competence in distinct scientific disciplines, but also a critical and informed understanding of the contexts (conceptual, historical, cultural, social) where science happens. Because of this, scientific literacy is a task orthogonal to different categories of people – the producers of scientific knowledge (the scientists), its users (different institutional actors and stakeholders, the lay citizens), the educators.
Within this framework the study of the philosophy and history of science and technology can play a crucial role in pursuing that task, provided that this study does not consist of an isolated, self-referential disciplinary pursuit, but it rather endorses a fruitful dialogue with the sciences themselves and the wider context of society.
Competent, plural and interactive scientific literacy can only come from creating suitable conditions for making a dialogue between the sciences and the humanities possible in principle and enforceable in practice: this is what this master's degree aims to achieve..
Disciplinary fields of interest: philosophy, history, medicine, biology, chemistry, physics, economics, as well as related applied areas such as public and social policy, health management, science communication, socio-political consultancy.

Objectives

By taking the task of scientific literacy in such a holistic perspective, this master's degree intends to train individuals in:

- Understanding the conceptual aspects and innovative uses of science and technology
- Critically reflecting on the cultural genesis and historical relevance of those very aspects
- Approaching science from an interdisciplinary perspective, encouraging mutual learning among experts in the fields of science, technology and the humanities.

Professional scientists nowadays are consulted not only as experts in their own scientific fields but also as actors and participants in social debates where science is called to play a role (advising policy, managing resources, assessing cost and benefits, making choices, etc.). The humanists (broadly conceived) are also asked to apply their competence in those very debates (ethical committees, multidisciplinary working tables, etc.), where the complex and interdisciplinary problems discussed require equally complex and interdisciplinary solutions.

The focus of this Master's degree is to create the conditions for the development of fungible abilities and provide befitting and innovative tools for students and professionals in need of responding to an increasingly challenging job market.

Besides offering basic training for those who intend to pursue an academic career in higher education, this Master's degree will aim at contributing to the training of careers such as: science advisor/policy consultant (European and extra -European institutions); designer and curator of scientific/cultural events and festivals; science museum curator; research facilitator/ project manager/project designer; school education expert in high-school teaching training.

Teaching modules

MODULE 1

Philosophy of science in practice

Scientific Advice, Decisions and Trust in public debate

This course aims at introducing a selection of concepts in the philosophy of science and philosophy of social science/economics that can be of use in the public sphere to address socially and politically relevant problems. It will pay specific attention to the traits, processes and mechanisms that help with understanding what makes science reliable, how science can relate to political/social discussion, and how much trust can be put on this discussion when science is part of it. Case studies and real-life examples will be used to illustrate the practical applicability of philosophical concepts.

Concept selection:

1) scientific evidence: how is it used by the 'evidence-based policy' movement?
2) objectivity: in what sense expert advice qualifies as 'objective'?
3) causal models: how are they/should they be used in policy making?
4) decision making: what is the type of reasoning that informs policy recommendations?
5) scientific expertise: what turns a scientific judgement into a policy advice? What use does/should it make of local knowledge?

Health, Disease and Enhancement

The course will address the standard and non-standard functioning of body, mind, and brain, and their mutual relations. It will tackle philosophical issues concerning different conceptions of health

and disease and approaches to modelling disorders (Part 1), and epistemological issues of cognitive science and neuroscience within the framework of the relationship between mind and brain, body and the environment, and artificial intelligence, including different aspects of cognitive enhancement (Part 2). Particular attention will be given to how conceptual discussion can inform practical use.
Concept selection:
1) disease: what counts as a pathological condition, and as evidence of disease?
2) explanation: how are diseases modelled for explanatory purposes?
3) nosology: how are diseases classified?
4) patienthood: how are patients diagnosed and grouped?
5) embodiment: what is the role of embodiment in cognitive science?
6) mind and brain: what is the relation between mind studies and neuroscience?
7) cognitive enhancement: how do we get cognitive enhancement from the standpoint of cognitive science and the sciences of the artificial?

Bioethics and the Law
This course will focus on the concept of law and its relation with morality, on the nature and definition of bioethics as public ethics, on the normative role of moral argumentation in applied ethics (Part 1), and with relevant bioethical questions related to science and technology, such as the problem of the neutrality of science, the relation between science and power, and the crucial question of collective and personal responsibility (Part 2). It will introduce a range of concepts in the philosophy of law and bioethics that can prove relevant for an adequate understanding of social and political problems arising from science and its applications in the sphere of human agency.
Concept selection:
1) what is law?
2) law and morality: connected or separate?
3) what is bioethics?
4) decision making: what is the role of moral argumentation?
5) science, power and responsibility

MODULE 2
Historicizing science and technology

Experience, Experiment, and Practical Knowledge
Where does the form of modern experiment in chemistry and medicine come from? The course will explore the practices of knowledge closer to artisanship and more resistant to quantification and mathematization (medicine, chemistry, alchemy) to investigate differences between experience and experimentation. The course will be arranged chronologically: (Part 1) Antiquity and Byzantium; (Part 2) Early modern science; (Part 3) Modernity.
Concept selection:
1) artisanal practices and observations from the workshops of craftsmen: what was their role in the writings of ancient natural philosophers, physicians and alchemists, and how can this role help us understanding the construction of experimental knowledge today?
2) experiences and experiments: what are their mutual relations in early modern science (in fields such as anatomy; surgery; botanic; farming practices) and in the spheres of everyday life, commerce, gender roles, and religious practices?

3) the term 'experiment': what is its modern meaning as used in different sites, such as laboratories, workshops, factories, and why did chemical experiments become important and normative for other sciences?

Concepts of Nature
The course explores the emergence of modern conceptions of nature out of changing theories of meteorology and climate in the age of the Scientific Revolution (Part 1), the development of the new disciplines of geology, seismology, climatology, and biology during the Enlightenment (Part 2), and recent discussions about the Antropocene and the debates about science and technology, pandemics, and climate change (Part 3).
Concept selection:
1) weather and climate change: how did ongoing conceptions in the sixteenth and seventeenth centuries, as voyages to the Americas and Asia fuelled by colonial aspirations, furnished the material for revised global conceptions of nature and climate?
2) prediction of natural events: how did experimental techniques support novel theoretical frameworks for both predicting weather and earthquakes and change causal explanations of these events? What "paradigm shift" led to the rise of measurement and prediction in meteorology and seismology after 1750?
3) natural disasters: how did the development of scientific ideas about weather and climate during this time period relates to a numerical increase of natural disasters and renewed attempts to explain them?
4) the relation between nature and society: how did political unrest and social control intersect with natural events?
5) past and present ecology: how do current-day ecological movement relate to earlier discussions about nature, technology and the economic exploitation of global natural resources? How did the globalization of knowledge in history affect the construction of nature as a passive entity?

Political Cultures of Science and Environmental Crisis
This course aims to introduce key questions in current debates on science and technology (Part 1) and use those questions to address and frame relevant issues emerging from ongoing debates on the environmental crisis (Part 2).
Concept selection:
1) facts in the age of post-truth: how can the issue of validity of science be framed?
2) the social-economic roots of science: how can they be uncovered and analysed?
3) science, political agency and expertise: what is their relation and how does it inform scientific responsibility in times of technical transformations in the earth system?
4) biopolitics and geopolitics: what is their entanglement within environmental discourse
5) a geological dimension of epistemology: does it have a role to play in the epoch of Anthropocene?

MODULE 3
Making Science Happen

Reasoning and Deliberating with Numbers

The course aims first, to provide the basic knowledge necessary to evaluate the reliability of statistical surveys and to understand statistical data, to know and avoid the cognitive biases of intuitive probabilistic reasoning, to educate to the use of correct and effective ways to show statistical data and for making rational decisions, taking into account the cognitive constraints in the use of information. The course also intends final to concentrate on a number of practical applications of probability and statistics in evidentiary reasoning.
Concepts selection:
1) Probability and statistics
2) Understanding probabilities
3) Data visualization
4) Decision making on constrained information
5) Uncertain reasoning in legal reasoning.

Project design and management
Scientific research nowadays is very much a collective and concerted effort. What does this imply in practice? This course intends to illustrate how to design and manage the whole life-cycle of a research project, from selecting topics and screening different calls for proposals funded by EU Commission, Private foundations or donors, International Cooperation grants to choosing and making use of the methodological and technical tools necessary for the formulation of a project proposal.
Key steps of analysis (including practical class exercises):
1) how to read a call for proposal/tender
2) how to choose project design methodologies
3) how to design useful tools: GANTT, Project Workflow, Project Budget definition
4) what 'Financial Management' consists of (Monitoring Project Expenditures and Budget level exhaustion)
5) how to handle Communication and Dissemination Management (Programme Visual Identity, Project Dissemination techniques, Social Media accounts Management, etc.)

Making science happen
This is an interdisciplinary seminar aimed at creating an interactive forum of discussion among experts in the sciences, technologies, humanities – from both academia and the wider world of the professions (science museum curators, curators of science exhibitions and festivals, artists, scientific advisors in political institutions, members of ethical committees, research managers in international research institutions, scientific experts in legal trials, science screenwriters).
Examples of interdisciplinary topics:
1) how to conceptualize, design and display art-science collaborative work, as in e.g. medical imaging and data visualization (fields of visual cultures of science, medicine, medical technology);
2) how to transfer economic measurement onto policy performativity as in e.g. the history of measuring 'development' over the last half century, especially in the switch from earlier forms of aggregate measurements to the dis-aggregated array of the UN's Sustainable Development Goals (fields of economic measurement/development economics, economic history, policy analysis, social statistics);
3) how to turn materials into objects, products and technologies (engineering, medical technologies, architecture, art design), what it takes to design new materials (fields of physics, chemistry, materials sciences),and to study the cultural and environmental significance and impact of materials (humanities, history of science, social sciences).

4) how to try and reproduce ancient procedures described in alchemical collections today, and how to understand their rationale and failures in the light of contemporary chemical knowledge (fields of chemistry, lab sciences, history of science).

Teaching structure and university credits (CFU – ECTS)

The Master's runs for **one year** (5 March 2020-5 March 2021). It includes **300 hours of compulsory teaching courses (at least 90 of which online)** for a total of 48 university credits (CFU – ECTS), **and a 250 hour internship**. For individuals already working professionally, the internship may be replaced by targeted project work. Including individual study, research and group work, it is estimated that the course will require an overall commitment of **1500 hours, for a total of 60 university credits (CFU – ECTS)**.

Qualification issued

Students attending all teaching modules, completing the internship and passing a final essay will be awarded a 1st Level Master's in Philosophy and history of science and technology.

Course period

MARCH 2021 – MARCH 2022

Course calendar

** The course calendar is under construction. It will be made available shortly.*

Teaching method

Classroom and online lectures, seminars, group work.

Language

English

Attendance

Attendance will be monitored by tracing individual accesses to the online platform. Regular attendance is mandatory to passing the single modules. Absences should not exceed 30% of the overall teaching hours. Credits are assigned upon completion of the single modules, of internship/project work activities and passing the final essay. Individuals employed in a professional activity that will be approved as coherent with the Master's framework and objectives may request recognition of the activity in lieu of the internship.

Course location

Venice
Bologna

Admission requirements

Three-year Bachelor's degree (or equivalent from Italian old university system) / Equivalent foreign university qualification, pending approval from the Master's Teaching Committee.
Students who at the time of application are not in possession of any of the qualifications above can still be admitten on probation but they will only be officially enrolled once the qualification will be awarded (one to two months from the start date of the Master's course).

Admission application

Candidates must complete the online admission application, the details of which are defined under article 3 of the University's Call for Application. Only applications including all the required documents will be considered. The Call for Application and relative attachments can be downloaded from the Master's web page.

Selection procedure

A selection board will assess candidates on the basis of their CV, the academic qualifications submitted and an interview in person or online (date, time and place will be communicated by email with sufficient advance notice).
The selection criteria will be: academic qualifications, knowledge of English language, motivation, relational skills, relevant former educational and professional experiences and commitment to course attendance.

Available places

Maximum number of available places: **30***
The Master's course will only be activated if at least **15 students have enrolled*

Course fees: € 3,500

/ 1st instalment by **5 February 2021**: € **1,766** (including € 16 revenue stamp)*
/ 2nd instalment by **25 May 2021**: **€ 1,750**
** Revenue stamp is not reimbursable.*

Selection fee: € 50

Not reimbursable, to be paid via PagoPA by 11/01/2021 on presentation of the admission application. Failure to pay the selection fee will result in exclusion from the selection process and from admission to the Master's programme.

Study support

Loans are available from the University's partner banks (for more information: http://www.unive.it/pag/8560/).

Enrolment

ADMISSION APPLICATION SUBMISSION (online procedure, Call for Applications, art. 3)
by 11 January 2021
SELECTION RESULT ANNOUNCEMENT
by 25 January 2021
ENROLMENT COMPLETION (online procedure, Call for Applications, art. 6)
by 5 February 2021

Start of course: **5 March 2021**

Course director

Prof. Eleonora Montuschi – Ca' Foscari University of Venice

Course coordinator

Prof. Raffaella Campaner – University of Bologna

Faculty

The faculty includes tutors from University of Venice Ca' Foscari and IUAV, and the University of Bologna – in collaboration with a number of invited scholars and experts from national and international universities and institutions.

For information

contact the Ca' Foscari Challenge School Administration Office: master.challengeschool@unive.it - tel. +39 041 234 6853