

College of Humanities at EPFL

A POLY-perspective vision for education, research and public engagement

Since 2002, the College of Humanities (CDH) of the Ecole Polytechnique Fédérale de Lausanne (EPFL) has developed a diverse range of teaching programs and research projects. In particular, the CDH oversees the Social and Human Sciences teaching program, a set of compulsory courses for all Bachelors and Masters students at EPFL. While originally intended as a teaching unit, in recent years the CDH has expanded its research activities at the intersection of the basic sciences, engineering, social sciences and the humanities. One important focus of our research is the field of digital humanities. The CDH plays an important role in knowledge mobilization and public engagement at EPFL, particularly through ArtLab, which was integrated into the CDH in 2017.

We pride ourselves on our compelling vision for encouraging and developing education, research and public engagement based on the concept of POLY-perspective. By POLY-perspective, we mean that future engineers and scientists should adopt a pluralist perspective on the challenges they face. The “holistic engineer” of the 21st century should be able to comprehend the complexities of today’s problems and be capable of interacting with specialists in other fields in order to propose more effective solutions to these challenges.

Our POLY-perspective vision is based on four interrelated pillars: interdisciplinarity, global awareness, active citizenship and creativity. Each and every of the CDH’s activities – be it in terms of teaching, research or public engagement – explicitly addresses at least two of these pillars.

An interdisciplinary perspective

Interdisciplinarity plays, and will continue to play, a very important role in the education of EPFL students by pushing them to interact with different fields of knowledge and bring together a range of different competencies. Different disciplines enrich one another when scholars work together and bring converging perspectives to the same issues. Studying several scientific fields and being confronted with different approaches leads to increased creativity and serendipitous solutions. The CDH therefore promotes the acquisition of cross-disciplinary knowledge and the integration of interdisciplinarity into future engineers’ practice. The goal is to enable students to gain an understanding of other scientific domains besides their own and integrate them into their work, thus bolstering their own field through the exchange of knowledge and competencies. The Global Issues course is one example of an intrinsically interdisciplinary teaching program: this mandatory course for first year students presents a thematic approach to major global challenges and is co-taught by one professor from the social and human sciences and one from the science and technology domain.

Although technical coursework is obviously intrinsic to the EPFL curriculum, social and human components are also considered crucial. We are convinced that engineers and scientists should be able to take a variety of elements into account during their studies and professional practice, including social, political, legal, economic, historical and ethical aspects. Students should be given the tools to understand the functioning of political and legal institutions, economic markets, social systems and historical dynamics in order to understand and anticipate the impacts of science and technology on those spheres. We at the CDH therefore work to raise EPFL students’ awareness of such aspects in recognition of the fact that science and technology are both significantly enriched by such perspectives and severely limited without them. This approach also forms the basis for a strongly reflexive practice. By promoting interdisciplinarity in the training of future engineers, the CDH helps prepare students for the realities of working life, either as researchers or outside of academics.

Interdisciplinarity is also at the center of the CDH’s cutting-edge research, such as in the digital humanities. The research goal of our Institute of Digital Humanities is to combine computational

thinking with all branches of the humanities and the social sciences. By applying an interdisciplinary perspective in its teaching and research projects, the CDH is also contributing to the long-standing international debate on how we understand interdisciplinarity and how it should develop going forward.

A global perspective

In addition to being able to respond to issues in the here and now, engineers and scientists also need to have a global perspective. A strong awareness of historical and cultural context therefore underpins the curriculum at EPFL. That is why the CDH works to instill sensitivity to such issues: we believe that understanding where technologies and societies come from – in terms of both history and culture – leads to the creation of fit-for-purpose products and to suitable and sustainable uses for existing and future technologies. This perspective is also adopted in CDH research projects, such as in Area and Global Studies.

The CDH has a broad temporal perspective. Many courses focus on understanding the present situation, but also take into account the past and the future. Historical considerations constitute a main pillar of the CDH's teaching. Being aware of the history of technology, society and knowledge gives EPFL students a solid background for their studies, research and future work. CDH professors also take pains to spotlight current and future issues and ensure that students discuss them. This enables students to reflect upon and anticipate future needs and problems, along with future uses for technology and their limitations.

Moreover, it is crucial that engineers and scientists should be sensitized to different cultural mindsets and to otherness in general, developing their capacity to take into account non-Western perspectives and think beyond their own cultural contexts. Indeed, the cultural components of technology and its uses are a fundamental issue for today's and tomorrow's engineers and scientists. The CDH considers such understanding to be essential, as the global context is becoming more and more significant in terms of technology development and transfer. Understanding the global context (in legal, artistic, social, economic and geopolitical terms) is prerequisite to the practice of engineering today. For example, the Science, Technology and Area Studies Minor offered by CDH enables students to experiment with a concrete application of their education in another part of the world, such as Russia or China, where political, social, economic and cultural issues are very different than in Europe.

A truly global perspective challenges static, bounded conceptual categories of science as well as assumptions of linear progression in human and societal development. It both prepares students to take an active role in increasingly global scientific and technological undertakings and strengthens the EPFL's position as a global player in the academic field. Experience with a globalized scientific and technological field early in their careers also opens new employment horizons for students.

A citizen perspective

Current upheavals in the world of technology have made ethics increasingly important in fields as diverse as artificial intelligence, big data, the life sciences, and more. Engineers and scientists must maintain high ethical standards and challenge unethical behavior. Moreover, EPFL students are more than just future engineers; they are also citizens. From this perspective, it is essential that they acquire a strong awareness of the social and ethical dimensions of their work, on the one hand, and their capacity for public engagement on the other.

The CDH aims to promote the capacity for self-reflection and critical skills that allow students to become aware of their potential roles and responsibilities as citizens within individual societies and in the world. Our curriculum prepares students to take into consideration, be reflective about and act in accordance with ethical issues related to their work. The CDH thus participates in building the critical minds of tomorrow's engineers by helping them to develop a sophisticated sense of social responsibility and enabling them to make informed decisions. The Social and Human Sciences program in particular has a crucial role to play, as it includes ethics courses.

The CDH also encourages students to be prepared to engage in public debate by forging connections that link their education and research to local and global audiences and a diverse range of

stakeholders. EPFL-trained engineers and scientists should be able to vulgarize and share their knowledge and research. In addition, the CDH promotes engagement through interaction with the public and getting people involved in science. By fostering engagement at the intersection of academia and society, ArtLab furthers EPFL's intellectual and tangible initiatives by bringing conceptually challenging ideas into dialogue with different communities.

A creative perspective

Creativity – in science and engineering – is generally understood as a novel way of thinking that allows people to redefine problems, generate and analyze ideas, and take reasonable risks in developing new ideas or products. It includes the ability to invent new theorems, new models, new concepts and new solutions to current problems. Even more fundamentally, being creative enables one to take new perspectives on the issues facing the world today. The creation and operation of new products, processes and systems is central to the work of scientists and engineers. As such, creativity is central not just to product innovation and profitability but, in a broader social sense, to the design and implementation of solutions to global challenges.

Creativity has been understood to encompass three dimensions: 1) generating novel ideas (also called divergent thinking), 2) connecting ideas that were not previously seen as connected (also called convergent thinking), and 3) having the openness and courage to explore new ideas. Being exposed to and engaging in multiple perspectives on any given issue can encourage the development of divergent and convergent creativity. The study of different social contexts and historical perspectives can also play a role in creating an awareness that how things are is not necessarily how they have to be. Likewise, an engagement with the arts and artistic production can provide greater understanding of the creative process.

That is why the CDH promotes a creative perspective as a fundamental pillar of its teaching and research activities. The teaching program offers courses taught in collaboration with the Geneva University of Art and Design (HEAD) and the Lausanne Cantonal School of Art (ECAL). ArtLab's mission is to promote innovation at the creative conjunction of art, engineering and the humanities. The CDH encourages the emergence of opinions that fall outside of mainstream thought. We also endeavor to bring diverse points of view and novel approaches to both the technical and human aspects of engineering.