Ways of Thinking

Stanford has always oriented its undergraduate teaching mission around two large goals: Jane and Leland Stanford's injunction in the Founding Grant to "qualify students for personal success and direct usefulness in life" and the University's motto, "Die Luft der Freiheit weht" ("The wind of freedom blows"). Today's students come of age in an increasingly globalized, connected world. They will face unprecedented challenges and opportunities, some of which we cannot yet imagine. To prepare students to flourish both as individuals and as members of society at the local, national, and global levels, our proposed general education requirements seek to engage faculty and students together in the intentional development of a multiplicity of ways of thinking. This document describes our proposal for breadth requirements based on Ways of Thinking, which both include and transcend the disciplines, emphasizing the aspects that students will take to all their future endeavors.

Skills requirements

The Ways of Thinking described in this document do not replace the need for foreign language, mathematics, and writing.

Moral and Ethical Reasoning – 1 course

Human conduct is framed by moral and ethical values and judgments. Ethical decisions are particularly challenging in an increasingly complex world. The ability to reason, draw defensible conclusions and assess competing claims is fundamental to development as an individual and to effective participation in society. Courses addressing moral and ethical reasoning introduce students to the pervasiveness, complexity and diversity of normative concepts and judgments, in the light of diverse ethical perspectives.

As examples of desirable learning outcomes, students should be able to: understand diverse normative concepts and arguments; develop and articulate ethical perspectives on concrete dilemmas; and evaluate competing ethical perspectives on human problems.

Aesthetic and Interpretative Understanding – 2 courses

Courses in literature and the arts introduce students to the creative disciplines and the domain of the imagination, offer unique approaches to understanding the human condition, and provide students with a foundation for analyzing and interpreting expressive written and artistic works. We recommend that student take one course in theory, history, or critical analysis, and one course that engages in the creation of art.

As examples of desirable learning outcomes, students should be able to: attain significant historical perspective on the materials of creative culture; develop skills for the study, analysis, and interpretation of expressive works; understand how to engage with a variety of literary forms; explore their potential to produce original creative projects; and acquire tools for engaging with artistic works that explore and articulate issues of humanity.

Empirical Reasoning – 1 course

The methods used in empirical reasoning and problem solving include statistics, probability, mathematics, logic, and decision theory. Empirical reasoning will enable students to devise a strategy based on evidence, gather data to implement their strategy, and assess empirical evidence with which they are presented. Empirical reasoning should be taught in the context of a variety of subjects matched to student interests, such as public policy, education, engineering, economics, politics, management science, medicine, and law.

As examples of desirable learning outcomes, students should be able to: set and solve optimization problems (broadly construed), use data, think probabilistically, and

evaluate risk; recognize when the available evidence is too weak to decide a matter and how to distinguish between causal evidence and correlational evidence; be comfortable not just with the abstract principles of probability theory, statistics, decision theory, logic, and mathematics, but with *applying* empirical methods to concrete problems and real data; devise an empirical strategy to answer a concrete question of wide concern; recognize common mistakes that human beings make in empirical reasoning and problem solving.

Scientific Analysis – 2 courses

Scientific literacy includes familiarity with the way in which knowledge about the natural world is obtained, analyzed and interpreted. Courses on scientific analysis should enhance the students' ability to analyze and synthesize scientific information, to understand the limitations and strengths of existing theories, and to ask strategic questions. We recommend that students take at least one class including a laboratory or field component.

As examples of desirable learning outcomes, students should be able to: understand the distinction between scientific fact and theory and the role of each in inquiry; utilize inductive and deductive reasoning and understand the role of each in scientific inquiry; formulate hypotheses and experimental designs to test those hypotheses; understand and work with probabilistic outcomes and risk analysis; and assess and synthesize scientific facts, concepts, theories and experimental data relating to the natural world.

Social Analysis – 2 courses

The human experience is pervaded by the choices individuals make and the opportunities they face. Society shapes these choices and opportunities, but social structures and practices vary across time and space so that individuals can end up with very different experiences. Social analysis helps us understand why social institutions differ and why they have the effects they do. These courses will use systematic theoretical and empirical inquiry to analyze societies critically. We recommend that students take at least one course that analyzes a non-U.S. society or societies.

As examples of desirable learning outcomes, students should be able to: apply the methods of research and inquiry from at least one social science discipline to the study of human behavior; evaluate rigorously the effects of social institutions on individual actions; use evidence and data, including at least some of the following: administrative/official records, surveys, cultural artifacts, experiments, interviews, oral histories, field observation; use strategies for making sense of data including causal reasoning, hypotheses testing, modeling, and critical analyses of behavior and institutions; identify how scholarship has influenced organized efforts to ameliorate social problems.

Engaging Difference – 1 course

In an increasingly complex world, it is crucial that students be prepared to understand the distinctions and variations among groups of people. Further, a respect for the diversity of experiences and perspectives that come from differences in gender, race, ethnicity, sexual orientation, and social class is essential for moving within shifting social contexts.

As examples of desirable learning outcomes, students should be able to: attain an understanding of the history and traditions of diverse groups of people; develop the ability to grapple with challenges that surface in interactions between people with diverse backgrounds and world views; acquire an understanding of power relationships within social and cultural contexts; and gain an appreciation for the richness of human difference.

Frequently Asked Questions about Ways of Thinking

How could these requirements be implemented and governed?
Faculty could submit their course syllabi to a standing breadth committee. During the initial ramp-up, the committee could recruit courses from the existing course catalog by encouraging submission of syllabi. In some cases (for example, moral and ethical reasoning) it may be necessary to provide resources for the creation of additional courses to meet the need. In most cases, many courses exist that may be good matches. Anecdotal evidence suggests that conversations about syllabi in the context of broader learning goals need not be time-consuming and can be inspirational for many faculty.

What modes of completion should be allowed for each of the requirements?
We believe the governing board should consider this question for each requirement and should have a mandate to respond to ongoing assessment. We strongly believe that placement tests or advanced placement should be considered for the math and language skills requirement. There is considerable sentiment for allowing co-curricular experiences with an academic component to count in some cases.

What about close reading?
Close reading is a fundamental skill in modern literary criticism. Classes in many of the ways of thinking, particularly "aesthetic and interpretative understanding" and "social analysis," would likely include a significant emphasis on close reading.

What about engineering?
Several of the ways of thinking categories are fundamental to engineering, and we imagine that classes in engineering would contribute in several of the proposed WOT categories, including but not limited to empirical reasoning and scientific analysis.

What about quantitative reasoning?
Mathematical thinking forms the basis for many fields of study and will often play a role (along with other ways of thinking) in major decisions our students will need to make in the future. Classes in the core skills of math have not always traditionally made the broader applications of mathematical thinking explicit. For this reason, we prefer to require a mimimum level of skill in math as such, and to let its applications become more clear through other classes, likely including at least empirical reasoning, scientific analysis, and social analysis, but possible other Ways of Thinking as well.

What about sustainability?
Sustainability is one of the most important topics of our time, arguably the most, and is a fantastic example of a problem that requires many modes of thought to address. As such it is not a single way of thinking but the result of a combination of many of the ways of thinking brought to practice.

What about studies of gender, ethnicity, and race?
We anticipate that many students will satisfy their requirements in "engaging difference" and/or "social analysis" through classes that focus on studies of gender, ethnicity, and race. We also hope that a general sensitivity to these issues will permeate the modern curriculum and Stanford culture, as well as being explicitly addressed in Residential Education.

What about historical reasoning?
Most classes in historical reasoning would meet the social analysis requirement and we expect that many students would choose to fulfill their social analysis requirement with history courses.