

The research field of Artificial Intelligence (A.I.) is exceptionally dynamic. The topics that could be considered relevant in A.I. range from applied studies of computer science to abstract philosophical discussions. Computer scientists are constantly trying, and steadily succeeding, to build a computer that bridges the supposed gap between men and machines. Historically we've seen obstacles, like chess playing, that we now see as a realm in which computers dominate humans. More recently we have seen considerable progress in areas like speech and object recognition. Perhaps sooner than many think we may see computers capable of completely natural discussions with humans, thus passing Alan Turing's test. One thing is for certain, the development of A.I. is an accelerating field whose relevance is likely to only increase.

In terms of usefulness an A.I. major is able to cover topics in a myriad of subjects. In fact, the major includes all of the requirements for a Computer Science major as well as Cognitive Science and Psychology minors. Furthermore, the University of Utah's School of Computing has said the major provides the knowledge necessary to be a successful graduate student here. I designed much of the major to include the requirements for the aforementioned major and minors offered here at the U with the intention of ensuring it would be recognized as having their same quality and usability. The top researchers in the field range in specialty from mathematics to psychology and of course computer science. While this major does focus on the Computer Science aspect of A.I., it attempts to address some of the philosophical implications in the field as well. The diversity of study in the field would afford immense opportunity to a student with such a degree. S/he could pursue A.I. research or go into any of the fields covered. Despite its Computer Science bias, such a student could enter the fields of psychology, cognitive science, or philosophy. My route would almost certainly be to go into A.I. research in the computer industry. The industry has no shortage of interest in A.I. development and most reputable Computer Science programs are focusing on it, just look at most of the research programs happening in our School of Computing. Researchers are looking for everything from conscious computers to smart grids for power distribution. Thanks to the depth of the degree I could also go into the computer industry through a more traditional route, by getting internships and working on application development like most Computer Science majors.

My original goal was to attempt to accomplish the same goals that this major does but without having to make a new one. This revealed problems early on. I soon discovered that in order to do this well, I would be so spread out and so weighed down with major requirements that weren't directly relevant that I would be here for a decade, or at least much longer than I would like. On top of that, none of the current degree options would be capable of providing me with the training and education in the topics that most interest me.

Computer Science:

- Artificial Intelligence is rooted in computer science. A tremendous amount of research within computer science is devoted to A.I. development and it was the birthplace of the concept. It has always been the core of A.I. development.

Mathematics:

- Math is used extensively in A.I. particularly to develop new, increasingly abstract, algorithms. Being comfortable and proficient in mathematics is vital in the A.I. field, just like it is in any computer science field.

Psychology/Cognitive Science:

- One proposed route to developing strong A.I. is through reverse engineering of the human mind. Approaches to this range from a literal reverse engineering of the brain to behavior emulation, both of which are addressed in psychology. A.I. is also, as the name implies, directly concerned with creating intelligence. Since A.I. attempts to create human level and higher intelligence, it is helpful to have at least some understanding of human intelligence from a behavioral science perspective.

Philosophy:

- A.I.'s highest ambition is to create artificial intelligent minds. In order to do this successfully, and even to know when we have or not, would require us to understand what a mind, or what intelligence, is. Considering concepts of mind is a philosophical project. For this reason the major should include ample attention to this, and other relevant philosophical theorizing. According to most informed sources, the advent of strong A.I. would be one of the most paradigm shifting developments in human history. It would be accompanied with a number of ethical issues. For example, how should A.I.s be treated? Should we condemn them to some kind of reward system like the one experience? Is it ok to give them the ability to feel pain, mental or physical?

A final project for this major would probably best embody the topic if it were a computer program that demonstrated some interesting concept or ability in the field. I plan on making a program that would focus on pattern recognition, an ability many A.I. theorists believe is one of the major gaps between humans and computers, hence the tremendous research focusing on the subject. This would likely involve something like speech or object recognition or perhaps even something with the ability to manipulate language instead of just recognizing it.

Major Emphasis Courses

Code	Course Number	Course Title	Department	Credit Hours
+	1210	Calculus 1	Math	4
+	1220	Calculus 2	Math	4
	2210	Calculus 3	Math	3
	2270	Linear Algebra	Math	4
	2210	Physics for Scientists and Engineers 1	Physics	4
ip	1410	Introduction to object-Oriented Programming	Computer Science	4
	2420	Introduction to Algorithms & Data Structures	Computer Science	4
	2100	Discrete Structures	Computer Science	3
	3100	Models of Computation	Computer Science	3
	3130	Engineering Probability and Statistics	Computer Science	3
	3500	Software Practice 1	Computer Science	4
	3505	Software Practice 2	Computer Science	3
	3810	Computer Organization	Computer Science	4
	4190	Programming Challenges	Computer Science	2
	4150	Algorithms	Computer Science	3
	5650/6650	Visual Perception from a Computer Graphics and Visualization perspective	Computer Science	3
	4400	Computer Systems	Computer Science	4
	4230	Parallel Programming	Computer Science	3
	5300	Artificial Intelligence	Computer Science	3
	5310	Robotics	Computer Science	3
	5320	Computer Vision	Computer Science	3
	5340	Natural Language Processing	Computer Science	3
	5350	Machine Learning	Computer Science	3
	4960	Senior Capstone Design	Computer Science	1
	4500	Senior Capstone Project	Computer Science	3
	1200	Introduction to the Study of Language	Linguistics or English	3
	4020	Introduction to Syntax	Linguistics	3
	3051	Cyberworlds	Sociology	3
	3200	Deductive Logic	Philosophy	3
	3300	Theory of Knowledge	Philosophy	3
	3400	Mind, Language, and Reality	Philosophy	3
	3440	Cognitive Science	Philosophy	3

	3910	Individual Research	Philosophy	2
	5450	Philosophy of Mind	Philosophy	3
	1010	General Psychology	Psychology	4
	2125	Everyday Decision Making	Psychology	3
	3120	Cognitive Psychology	Psychology	3
	3130	Mind and Nature	Psychology	4
	3140	Cognitive Neuropsychology	Psychology	3
	3150	Sensation and Perception	Psychology	3
	3000	Statistical Methods in Psychology	Psychology	4
	3160	Human Error	Psychology	3
	3711	Brain and Behavior	Psychology	4
	5120	Advanced Human Cognition	Psychology	4
	2220 or 5050	Nature and Virtuality	English	3

Remaining Generals and Honors Requirements

Code	Course Number	Course Title	Department	Credit Hours	Requirement
	3200	Writing in a Research University	Honors	3	CW
	NA	Any Honors Diversity Class		NA	DV
	NA	Any Honors International Class		NA	IR
	4999	Honors Thesis	Honors	NA	NA

Total Major Emphasis Credit Hours: 145

Total 4000+ Hours: 44

Number of Major Classes: 48

Yet to be completed: 137

Hours by College:

Math: 15

Physics: 4

Computer Science: 62

Linguistics: 6

Sociology: 3

Philosophy: 17

Psychology: 35

English: 3