COGNITIVE SCIENCE (Div II)
Chair: Professor Safa Zaki

- Joseph L. Cruz, Professor of Philosophy
- Andrea Danyluk, Mary A and William Wirt Warren Professor of Computer Science; on leave Fall 2019
- Kris N. Kirby, Professor of Psychology; on leave Fall 2019
- Nate Kornell, Associate Professor of Psychology
- Heather Williams, William Dwight Whitney Professor of Biology
- Safa R. Zaki, Professor of Psychology, Chair of Cognitive Science Program

Cognitive science is concerned with how humans, non-human animals, and computers acquire, represent, manipulate, and use information. As an interdisciplinary field it combines research and theory from computer science (e.g., artificial intelligence), cognitive psychology, philosophy, linguistics, and neuroscience, and to some extent evolutionary biology, math, and anthropology. Complex issues of cognition are not easily addressed using traditional intra-disciplinary tools. Cognitive researchers in any discipline typically employ a collection of analytic and modeling tools from across traditional disciplinary boundaries. Thus, the methods and research agenda of cognitive science are broader than those of any of the fields that have traditionally contributed to cognitive science. The Cognitive Science Program is designed to provide students with the broad interdisciplinary foundation needed to approach issues of cognition.

THE CONCENTRATION

The concentration in Cognitive Science consists of six courses, including an introductory course, four electives, and a senior seminar.

Minds, Brains, and Intelligent Behavior (COGS 222) is the entry point into the concentration, and provides an interdisciplinary perspective on issues of cognition. Ideally, it should be taken before the end of the sophomore year. Emphasizing the highly interdisciplinary nature of the field, the four electives must be distributed over at least three course prefixes. In the fall of the senior year, concentrators will participate in a senior seminar (COGS 493) or a senior tutorial, depending on enrollments.

Required Courses

- COGS/PHIL/PSYC 222 Minds, Brains, and Intelligent Behavior: An Introduction to Cognitive Science
- COGS 493 Senior Seminar or Senior Tutorial (In years where 493 is not offered, students should contact the Program Chair for details).

Elective Courses

Four electives are required, chosen from at least three prefixes, at most two of which can be at the 100 level.

- BIOL 204(S)Animal Behavior
  Taught by: Manuel Morales
  Catalog details
- CSCI 134(F, S)Introduction to Computer Science
  Taught by: Jeannie R Albrecht, Andrea Danyluk, Iris Howley, Thomas Murtagh, Shikha Singh
  Catalog details
- CSCI 361 / MATH 361(F, S)Theory of Computation
  Taught by: Thomas Murtagh, Aaron Williams
  Catalog details
- CSCI 373Artificial Intelligence
  Taught by: Jon Park
  Catalog details
- CSCI 374 T(S)Machine Learning
  Taught by: Andrea Danyluk
  Catalog details
- NSCI 201 / BIOL 212 / PSYC 212(F)Neuroscience
  Taught by: Tim Lebestky, Martha Marvin, Shivon Robinson
  Catalog details
- PHIL 207Contemporary Philosophy of Mind
  Taught by: Joseph Cruz
  Catalog details
- PHIL 216 / ENVI 216Philosophy of Animals
  Taught by: Joseph Cruz
PHIL 388 TConsciousness
Taught by: Joseph Cruz

PSYC 221(S)Cognitive Psychology
Taught by: Nate Kornell

PSYC 322(S)Concepts: Mind, Brain, and Culture
Taught by: Safa Zaki

PSYC 324 TGreat Debates in Cognition
Taught by: TBA

PSYC 326(S)Choice and Decision Making
Taught by: TBA

PSYC 327Cognition and Education
Taught by: Nate Kornell

REL 288 / PHIL 288(F)Embodiment and Consciousness: A Cross-Cultural Exploration
Taught by: Joseph Cruz, Georges Dreyfus

Recommended Courses

The following courses are recommended for students seeking a richer background in cognitive science. These will not count as electives for the cognitive science concentration.

BIOL 305(S)Evolution
Taught by: Luana Maroja

MATH 250(F, S)Linear Algebra
Taught by: Eva Goedhart, Haydee M. A. Lindo

PHIL 209 / SCST 209Philosophy of Science
Taught by: Bojana Mladenovic

PSYC 201(F, S)Experimentation and Statistics
Taught by: Jeremy Cone, Kris Kirby, Kenneth Savitsky

STAT 101(F, S)Elementary Statistics and Data Analysis
Taught by: Elizabeth Upton

STAT 201(F, S)Statistics and Data Analysis
Taught by: Stewart Johnson, Shaoyang Ning

STAT 344Statistical Design of Experiments
Taught by: Richard De Veaux

Formal admission to candidacy for honors will occur at the end of the fall semester of the senior year and will be based on promising performance in COGS 493. This program will consist of COGS W31-494(S), and will be supervised by members of the advisory committee from at least two departments. Presentation of a thesis, however, should not be interpreted as a guarantee of a degree with honors.

STUDY ABROAD

Students who wish to discuss plans for study abroad are invited to meet with any member of the Cognitive Science advisory committee.

FAQ

Can your department or program typically pre-approve courses for major/concentration credit?

Yes, in many cases, though students should be sure to contact the department.

What criteria will typically be used/required to determine whether a student may receive major/concentration credit for a course taken while on study away?
Complete syllabus and course description, including readings/assignments.

**Does your department/program place restrictions on the number of major/concentration credits that a student might earn through study away?**

No.

**Does your department/program place restrictions on the types of courses that can be awarded credit towards your major?**

No. As long as the study abroad courses conform to the interdisciplinary distribution requirements of the concentration.

**Are there specific major requirements that cannot be fulfilled while on study away?**

No.

**Are there specific major requirements in your department/program that students should be particularly aware of when weighing study away options? (Some examples might include a required course that is always taught in one semester, laboratory requirements.)**

No.

Give examples in which students thought or assumed that courses taken away would count toward the major or concentration and then learned they wouldn’t:

None to date.

---

**COGS 222 (F)** Minds, Brains, and Intelligent Behavior: An Introduction to Cognitive Science

**Cross-listings:** PSYC 222 COGS 222 PHIL 222

**Primary Cross-listing**

This course will emphasize interdisciplinary approaches to the study of intelligent systems, both natural and artificial. Cognitive science synthesizes research from cognitive psychology, computer science, linguistics, neuroscience, and contemporary philosophy. Special attention will be given to the philosophical foundations of cognitive science, representation and computation in symbolic and connectionist architectures, concept acquisition, problem solving, perception, language, semantics, reasoning, and artificial intelligence.

**Class Format:** discussion

**Requirements/Evaluation:** midterm and final exams, and self-paced weekly exercises

**Prerequisites:** PSYC 101 or any introduction to PHIL course or CSCI 134 or permission of instructor; background in more than one of these is recommended

**Enrollment Limit:** 25

**Enrollment Preferences:** first-year and sophomore students

**Expected Class Size:** 25

**Grading:** yes pass/fail option, no fifth course option

**Unit Notes:** meets Contemporary Metaphysics & Epistemology requirement only if registration is under PHIL

**Distributions:** (D2)

This course is cross-listed and the prefixes carry the following divisional credit:

PSYC 222 (D2) COGS 222 (D2) PHIL 222 (D2)

**Attributes:** Linguistics PHIL Contemp Metaphysics + Epistemology Courses PSYC 200-level Courses

---

**Fall 2019**

LEC Section: 01     TR 11:20 am - 12:35 pm     Joseph L. Cruz

---

**COGS 493 (S)** Advanced Topics in Mind and Cognition

In the last decade the science of the mind has continued to draw on its 20th century history as well as expand its methodological repertoire. In this seminar we will investigate current trends in mind and cognition by considering research in cognitive neuroscience, embodied cognition, dynamic systems theory, and empirical approaches to consciousness. Throughout, we will attend both to the specific empirical details as well as the conceptual foundations of this work. We will discuss how it elaborates, expands, and sharpens early views of the domain and methodology of philosophy of mind
and cognitive science.

Requirements/Evaluation: weekly short essays 1000 words, seminar presentation, final paper/project 7,000 words

Prerequisites: senior Cognitive Science concentrator

Enrollment Limit: 12

Enrollment Preferences: open only to senior Cognitive Science concentrators

Expected Class Size: 7

Grading: no pass/fail option, yes fifth course option

Distributions: (D2)

---

Spring 2020

SEM Section: 01 TBA Joseph L. Cruz

**COGS 494 (S) Senior Thesis: Cognitive Science**

The senior concentrator, having completed the senior seminar and with approval from the advisory committee, may devote winter study and the spring semester to a senior thesis based on the fall research project.

Prerequisites: permission of program chair

Grading: yes pass/fail option, yes fifth course option

Distributions: (D2)

---

Spring 2020

HON Section: 01 TBA Safa R. Zaki

**COGS 497 (F) Independent Study: Cognitive Science**

Cognitive Science independent study.

Prerequisites: permission of program chair

Grading: yes pass/fail option, yes fifth course option

Distributions: (D2)

---

Fall 2019

IND Section: 01 TBA Safa R. Zaki

**COGS 498 (S) Independent Study: Cognitive Science**

Cognitive Science independent study.

Prerequisites: permission of program chair

Grading: yes pass/fail option, yes fifth course option

Distributions: (D2)

---

Spring 2020

IND Section: 01 TBA Safa R. Zaki

**Winter Study**

---

**COGS 31 (W) Senior Thesis: Cognitive Science**

May be taken by students registered for Cognitive Science 494.
**Class Format:** independent study  
**Grading:** pass/fail only

Winter 2020  
HON Section: 01  TBA  Safa R. Zaki

**COGS 99 (W) Ind Study: Cognitive Science**  
Open to upperclass students. Students interested in doing an independent project (99) during Winter Study must make prior arrangements with a faculty sponsor. The student and professor then complete the independent study proposal form available online. The deadline is typically in late September. Proposals are reviewed by the pertinent department and the Winter Study Committee. Students will be notified if their proposal is approved prior to the Winter Study registration period.  
**Class Format:** independent study  
**Grading:** pass/fail only

Winter 2020  
IND Section: 01  TBA  Safa R. Zaki