**COGNITIVE SCIENCE (Div II)**

**Chair:** Professor Safa Zaki

Advisory Committee: Professors: J. Cruz, A. Danyluk, K. Kirby, H. Williams, S. Zaki. Associate Professor: N. Kornell.

On leave fall only: A. Danyluk, K. Kirby

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.

<table>
<thead>
<tr>
<th>Elective Course</th>
<th>Prefixes</th>
<th>Course Details</th>
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<tbody>
<tr>
<td>BIOL 204(S)Animal Behavior</td>
<td>BIOL</td>
<td>Taught by: Manuel Morales</td>
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<tr>
<td>CSCI 134(F, S)Introduction to Computer Science</td>
<td>CSCI 134</td>
<td>Taught by: Jeannie R Albrecht, Andrea Danyluk, Iris Howley, Thomas Murtagh, Shikha Singh</td>
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<tr>
<td>CSCI 361 / MATH 361(F, S)Theory of Computation</td>
<td>CSCI 361</td>
<td>Taught by: Thomas Murtagh, Aaron Williams</td>
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<tr>
<td>CSCI 373 Artificial Intelligence</td>
<td>CSCI 373</td>
<td>Taught by: Jon Park</td>
</tr>
<tr>
<td>NSCI 201 / BIOL 212 / PSYC 212(F)Neuroscience</td>
<td>NSCI 201</td>
<td>Taught by: Tim Lebestky, Martha Marvin, Shivon Robinson</td>
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<tr>
<td>PHIL 207 Contemporary Philosophy of Mind</td>
<td>PHIL 207</td>
<td>Taught by: Joseph Cruz</td>
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<tr>
<td>PHIL 216 / ENVI 216 Philosophy of Animals</td>
<td>PHIL 216</td>
<td>Taught by: Joseph Cruz</td>
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<tr>
<td>PHIL 388 T Consciousness</td>
<td>PHIL 388</td>
<td>Taught by: Joseph Cruz</td>
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<tr>
<td>PSYC 221(S)Cognitive Psychology</td>
<td>PSYC 221</td>
<td>Taught by: Nate Kornell</td>
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<tr>
<td>PSYC 322(S)Concepts: Mind, Brain, and Culture</td>
<td>PSYC 322</td>
<td>Taught by: Joseph Cruz</td>
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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**

Students MUST contact departments/programs BEFORE assuming study away credit will be granted toward the major or concentration.

**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.

Class Format: seminar
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 COGS concentrators

**Expected Class Size:** 7

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

**Distributions:** (D2)

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**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.

**Class Format:** independent study

**Prerequisites:** permission of program chair

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

**Distributions:** (D2)

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**Spring 2020**

SEM Section: 01    TBA    Joseph L. Cruz

**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)

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**Fall 2019**

IND Section: 01    TBA    Safa R. Zaki

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

Cognitive Science independent study.

**Class Format:** independent study

**Prerequisites:** permission of program chair

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

**Distributions:** (D2)

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**Spring 2020**

IND Section: 01    TBA    Safa R. Zaki

**Winter Study**

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**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
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