BACHELOR OF SCIENCE IN COGNITIVE SCIENCE

WHAT IS COGNITIVE SCIENCE?

Cognitive Science is the interdisciplinary study of the mind as an information processor. It is a relatively new discipline that arose in the mid-20th century from a convergence of conceptual revolutions primarily in psychology, computer science, and linguistics. Today it also draws from fields such as philosophy, neuroscience, and anthropology. A central goal of cognitive science is to determine structures and processes that underwrite cognitive tasks such as perception, memory, attention, language and motor control. This, in turn, plays an important role in applied research areas such as artificial intelligence, educational psychology, the science of language, and communication disorders.

CAREER PATHS

There is no single career path for Cognitive Science majors. It is anticipated that most graduates of the program will seek postgraduate training to satisfy their professional aspirations. Our undergraduates have pursued a broad range of degrees at both the master’s and PhD levels. Examples include: audiology, cognitive science, computer science, linguistics, medicine, neuroscience, nursing, occupational therapy, public health administration, speech/language pathology, philosophy, and psychology. Cognitive science prepares one with a solid educational foundation in human cognition and considerable skills in scientific reasoning, critical thinking, and clarity of expression. We have an excellent record of graduate placement and success. Because admission to graduate programs is highly competitive, we strongly recommend that students maintain a 3.6 GPA or higher.

THE COGNITIVE SCIENCE CURRICULUM

There are two parts to the Cognitive Science B.S. The first is a set of core courses required of all cognitive science majors. The second is a minimum of 18 credits in an area of specialization.

- No course can be used to satisfy more than one requirement. Example: If you take PSYC314 as one of your core requirements (1B), you may not use it towards your area of specialization (section 2).
- Students must earn a C- or higher in all courses within the major, including those that make up the area of specialization. However, CGSC378, CGSC379, and CGSC380 have a prerequisite requirement of a C or better in CGSC376.
- 600-level courses count only for those working towards an honors B.S. in Cognitive Science.
- CGSC majors who are majoring or minoring in linguistics may not use the same courses to count towards both degrees or programs, with the exception of LING 101 and CGSC485.
CGSC BS, CORE COURSES, 25 CREDITS

A. ALL OF THE FOLLOWING, 12 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGSC 170</td>
<td>Introduction to Cognitive Science</td>
<td>Take freshman or sophomore year</td>
</tr>
<tr>
<td>CGSC 485</td>
<td>Seminar in Cognitive Science</td>
<td>Take senior year. Satisfies 2nd Writing requirement</td>
</tr>
<tr>
<td>LING 101</td>
<td>Introduction to Linguistics</td>
<td>Take first semester in major.</td>
</tr>
<tr>
<td>PSYC 100</td>
<td>General Psychology</td>
<td>Take first year in major. NSCI 100 is an acceptable substitute, email Dr. Larsen (<a href="mailto:dlarsen@udel.edu">dlarsen@udel.edu</a>)</td>
</tr>
</tbody>
</table>

B. ADVANCED PSYC/CGSC COURSE: ONE OF THE FOLLOWING, 3 CREDITS

**Recommendation:** Take junior or senior year. Students who are doing especially well in the major may wish to complete this requirement earlier, say spring semester of sophomore year.

**Reminder:** The course used to satisfy this requirement may not be double counted towards your area of specialization requirement.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>CoReq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGSC 410</td>
<td>Embodied Cognition</td>
<td></td>
</tr>
<tr>
<td>CGSC 420</td>
<td>Research Methods in Cognitive Sci.</td>
<td>PSYC 209 or STAT200 or substitutes</td>
</tr>
<tr>
<td>CGSC 451</td>
<td>Topics in Cognitive Science</td>
<td></td>
</tr>
<tr>
<td>PSYC 314</td>
<td>Brain and Behavior</td>
<td>PSYC 100 or NSCI100 (C- or above)</td>
</tr>
<tr>
<td>PSYC 340</td>
<td>Cognition</td>
<td>PSYC 207 &amp; PSYC 209 or substitutes (C- or above)</td>
</tr>
<tr>
<td>PSYC 350</td>
<td>Developmental Psychology</td>
<td>PSYC 207 &amp; PSYC 209 or substitutes (C- or above)</td>
</tr>
</tbody>
</table>

C. BIOLOGY REQUIREMENT: ONE OF THE FOLLOWING, 4 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>CoReq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BISC 104</td>
<td>Principles of Biology w/Lab</td>
<td></td>
</tr>
<tr>
<td>BISC 207</td>
<td>Introductory Biology I</td>
<td>CHEM103, 107 or 111</td>
</tr>
</tbody>
</table>

D. COMPUTATIONAL REQUIREMENT: ONE OF THE FOLLOWING, 3 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>CoReq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 101</td>
<td>Principles of Computing</td>
<td></td>
</tr>
<tr>
<td>CISC 103</td>
<td>Intro. to Computer Sci. w/Web Apps</td>
<td>CISC106 as substitute, email Dr. Larsen</td>
</tr>
<tr>
<td>CISC 108</td>
<td>General Computer Science</td>
<td>MATH 115, 117 or higher</td>
</tr>
<tr>
<td>LING 202</td>
<td>Science of Language</td>
<td>LING 101</td>
</tr>
<tr>
<td>PHIL 205</td>
<td>Logic</td>
<td></td>
</tr>
</tbody>
</table>

E. STATISTICS REQUIREMENT: ONE OF THE FOLLOWING, 3 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>PreReq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 202</td>
<td>Intro to Statistical Methods 2</td>
<td>MATH 201</td>
</tr>
<tr>
<td>MATH 205</td>
<td>Statistical Methods</td>
<td>MATH 210 or MATH 230</td>
</tr>
<tr>
<td>PSYC 209</td>
<td>Measurement &amp; Statistics</td>
<td>PSYC 100</td>
</tr>
<tr>
<td>SOCI 301</td>
<td>Intro to Sociological Research</td>
<td>SOCI 201 and A&amp;S Math Skills Requirement</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Basic Statistical Practice</td>
<td></td>
</tr>
</tbody>
</table>
AREA OF SPECIALIZATION REQUIREMENT: 18-27 CREDITS

In addition to completing 25 credits of required core courses, students must complete a minimum of 18 additional credit hours in one of the following areas of specialization. (Some areas of specialization exceed 18 hours.)
- Substitute courses may be proposed in writing to Dr. Larsen
- **Reminder**: No course can count more than once towards the BS in Cognitive Science. That is, one may not use a core course and count it towards one’s area of specialization.

**OPTION 1. COMPUTATIONAL, MATHEMATICAL, & LOGICAL FOUNDATIONS OF COGNITIVE SCIENCE, 18 CR**

Students in this area of specialization are strongly encouraged to minor in Computer Science.

A. **Two of the Following, 6 credits**
   - CGSC 455 Computational Linguistics (C/L LING455)* Prereq: LING101
   - CGSC 470 Elements of Cognitive Science
   - LING 404 Structure of Language Prereq: LING101
   - LING 451 Logical Structures in Language* Prereq: LING101
   *CGSC 455 and LING 451 will not be offered in the near future

B. **All of the Following, 6 credits**
   - CISC 181 Intro to Computer Science II* Prereq: CISC106 or 108.
   - Coreq: MATH221 or 241 or higher
   *Changing Fall 2018; Contact Dr. Larsen for information
   - CISC 220 Data Structures Prereq: CISC181

C. **One of the Following, 3 credits**
   - CISC 275 Intro to Software Engineering Prereq: CISC220
   - CISC 303 Automata Theory Prereq: CISC220 and MATH210
   - CISC 304 Logic and Programming Prereq: CISC220 and MATH210

D. **One of the Following, 3 Credits**
   - CISC 401 Elements of the Theory of Computation Prereq: CISC303
   - CISC 404 Logic in Computer Science Prereq: CISC304
   - CISC 470 Programming Languages Prereq: CISC275
   - CISC 481 Artificial Intelligence Prereq: CISC220 and 304
   - CISC 484 Intro to Machine Learning Prereq: CISC220 and MATH205
   - CISC 489 Topics in Artificial Intelligence Prereq: CISC481

**OPTION 2. SCIENCE OF LANGUAGE, 18 CR**

- CGSC majors who are majoring or minoring in linguistics may not use the same courses to count towards both degrees or programs, with the exception of LING 101 and CGSC485.

A. **All of the Following, 6 Credits**
   - LING403 Introduction to Phonology Prereq: LING101 and LING202
   - LING404 Structure of Language Prereq: LING101

B. **One of the Following, 3 Credits**
   - LING418 Meaning and Language Use Prereq: LING101
   - CGSC 490 Philosophy of Language (C/L PHIL 490)

C. **And 9 credits** of LING courses or CGSC courses cross-listed with LING.
OPTION 3. PHILOSOPHICAL FOUNDATIONS OF COGNITIVE SCIENCE, 18 CR

Six of the Following, 18 Credits. **15 credits must be at the 300-level or above.**

CGSC 102 Language, Mind, and Society (C/L LING102)
CGSC 202 Genes, Bones, and Human Evolution (C/L ANTH202)
CGSC 205 Anthropology and Human Nature (C/L ANTH205)
CGSC 327 Race, Gender, Science (C/L, PHIL/WOMS/BAMS 327)
CGSC 404 Animal Minds (possible C/L, PHIL404)
CGSC 410 Embodied Cognition (C/L PHIL 410)
CGSC 418 Meaning & Language Use (C/L LING & PHIL 418) Prereq: LING101

CGSC 420 Research Methods in Cognitive Science
CGSC 421 Philosophy, Biology, Society (C/L PHIL 321)
CGSC 450 Recent Topics in Philosophy of Mind (C/L PHIL 450)
CGSC 451 Topics in Cognitive Science
CGSC 455 Computational Linguistics (C/L LING 455)
CGSC 470 Elements of Cognitive Science
CGSC 490 Philosophy of Language (C/L PHIL 490)

LING 444 First Language Development Prereq: LING101
LING 451 Logical Structures in Language Prereq: LING101

PHIL 205 Logic
PHIL 207 Scientific Reasoning
PHIL 211 Basic Decision Theory
PHIL 305 Twentieth Century Philosophy
PHIL 306 Philosophy of Science
PHIL 315 Metaphysics
PHIL 316 Time Travel
PHIL 317 American Philosophy
PHIL 320 Theory of Knowledge (C/L CGSC 320)
PHIL 330 Philosophy of Mind (C/L CGSC 330)

OPTION 4. PSYCHOLOGICAL FOUNDATIONS OF COGNITIVE SCIENCE, 18 CR

- Students in this area of specialization are strongly encouraged to minor in psychology.
- **Reminder:** Students may not double count any core courses towards one’s area of specialization.

A. **Three of the Following, 9 Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Prereq</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSCI 320</td>
<td>Intro to Neuroscience (C/L PSYC320)</td>
<td>PSYC100 or NSCI100</td>
</tr>
<tr>
<td>NSCI 431</td>
<td>Stress and the Brain</td>
<td>NSCI320</td>
</tr>
<tr>
<td>NSCI 433</td>
<td>Cognitive Neuroscience (C/L PSYC 433)</td>
<td>PSYC209</td>
</tr>
<tr>
<td>NSCI 468</td>
<td>Advanced Research</td>
<td>NSCI368, NSCI majors/minors only.</td>
</tr>
<tr>
<td>PSYC 310</td>
<td>Sensation &amp; Perception</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 312</td>
<td>Learning &amp; Motivation</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 314</td>
<td>Brain &amp; Behavior (C/L CGSC314)</td>
<td>PSYC100 or NSCI100</td>
</tr>
<tr>
<td>PSYC 325</td>
<td>Child Psychology</td>
<td>PSYC100</td>
</tr>
<tr>
<td>PSYC 334</td>
<td>Abnormal Psychology</td>
<td>PSYC100</td>
</tr>
<tr>
<td>PSYC 340</td>
<td>Cognition (C/L CGSC 340)</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 344</td>
<td>Psychology of Language</td>
<td>PSYC209</td>
</tr>
<tr>
<td>PSYC 350</td>
<td>Developmental Psychology</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 365</td>
<td>Psychology Field Placement</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 380</td>
<td>Psychopathology</td>
<td>PSYC100</td>
</tr>
<tr>
<td>PSYC 408</td>
<td>Psychology of Prejudice</td>
<td>PSYC207 &amp; 209</td>
</tr>
<tr>
<td>PSYC 414</td>
<td>Drugs in the Brain (C/L NSCI 414)</td>
<td>PSYC209</td>
</tr>
<tr>
<td>PSYC 431</td>
<td>Hormones and Behavior</td>
<td>PSYC100 or NSCI100 &amp; PSYC209</td>
</tr>
<tr>
<td>PSYC 436</td>
<td>Nature vs Nurture</td>
<td></td>
</tr>
</tbody>
</table>

This form was last updated November 10, 2017
PSYC 440  Topics in Psycholinguistics  Prereq: PSYC207 & 209
PSYC 442  Perception, Memory, and Imagination  Prereq: PSYC207 & 209
PSYC 445  Topics in Adolescent Psychology  Prereq: PSYC207 & 209
PSYC 446  Psychology of Music  Prereq: PSYC100
PSYC 481  Clinical Psychology  Prereq: PSYC207 & 209
PSYC 491  Psychology of Temporal Orientation  Prereq: PSYC207 & 209

B. Three of the Following: 9 Credits, 6 Credits must be at the 300-level or above.

ANTH 202  Genes, Bones, and Human Evolution (C/L CGSC202)
ANTH 205  Anthropology & Human Nature (C/L CGSC205)
ANTH 305  The Evolution of Human Sex Roles
CGSC 327  Race, Gender Science (C/L PHIL, BAMS, WOMS 327)
CGSC 404  Animal Minds (possible C/L, PHIL404)
CGSC 410  Embodied Cognition
CGSC 418  Meaning & Language Use (C/L LING/PHIL 418)
CGSC 420  Research Methods in Cognitive Science  Pre-req: CGSC STAT requirement
CGSC 451  Topics in Cognitive Science
CGSC 455  Computational Linguistics
CGSC 490  Philosophy of Language (C/L PHIL490)
CGSC 496  Psycholinguistics  Prereq: LING101
LING 102  Language, Mind, and Society
LING 202  Science of Language  Prereq: LING101
LING 404  Structure of Language  Prereq: LING101
LING 444  First Language Development  Prereq: LING101
LING 451  Logical Structures of English  Prereq: LING101
LING 462  Language Acquisition  Prereq: LING101
LING 480  Sociolinguistics  Prereq: LING101
PHIL102  Critical Thinking
PHIL 205  Logic
PHIL 207  Scientific Reasoning
PHIL 211  Basic Decision Theory
PHIL 305  Twentieth Century Philosophy
PHIL 306  Philosophy of Science
PHIL 320  Theory of Knowledge (C/L CGSC320)
PHIL 330  Philosophy of Mind (C/L CGSC330)
**OPTION 5. PRE-PROFESSIONAL SPEECH-LANGUAGE PATHOLOGY, 27 CR**

- Grad programs vary in their pre-req. courses they require. You can research pre-requisites through ASHA's EdFind (asha.org/edfind/)
- Some courses for the SLP concentration are restricted to CGSC majors.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING 353</td>
<td>Intro to Speech and Hearing Science</td>
<td>Prereq: LING101, Requires a laptop computer</td>
</tr>
<tr>
<td>CGSC 376</td>
<td>Introduction to Communication Disorders</td>
<td>Prereq: LING101</td>
</tr>
<tr>
<td>CGSC 378</td>
<td>Anatomy and Physiology of Speech</td>
<td>Prereq: LING101; <strong>C or better in CGSC376</strong></td>
</tr>
<tr>
<td>CGSC 379</td>
<td>Audiology</td>
<td>Prereq: LING101; <strong>C or better in CGSC376</strong></td>
</tr>
<tr>
<td>CGSC 380</td>
<td>Clinical Principles &amp; Procedures in SLP*</td>
<td>Prereq: LING101; <strong>C or better in CGSC376</strong></td>
</tr>
<tr>
<td>CGSC 433</td>
<td>Introduction to Acoustic Phonetics</td>
<td>Prereq: LING353, Requires a laptop computer</td>
</tr>
<tr>
<td>CGSC 496</td>
<td>Psycholinguistics</td>
<td>Prereq: LING101</td>
</tr>
</tbody>
</table>

**All of the Following, 21 Credits**

**One of the Following, 3 Credits**

- LING 403 Introduction to Phonology Prereq: LING101 and LING202
- LING 480 Sociolinguistics Prereq: LING101

**One of the Following, 3 Credits**

- LING 444 First Language Development Prereq: LING101
- LING 462 Lang. Acquisition (C/L EDUC& PSYC462) Prereq: LING101

**Recommended Elective Courses for Option 5:**

- Not Required for Completion of CGSC BS, but Useful for Graduate School Admissions
  - Graduate programs often have a physical science requirement. This can be fulfilled at UD with one of the follow: CHEM 101, CHEM 102, CHEM 103, CHEM 104, CHEM 105, or PHYS 201. Alternatively, a student can take any intro to chemistry or intro to physics course at another institution; no lab required.
  - LING 403, if you did not take it as one of your area of specialization courses.
  - LING 480, if you did not take it as one of your area of specialization courses.
  - ENGL 410: Technical Writing  -- OR -- ENGL 415: Writing in the Professions
  - HDFS 339: Adult Development and Aging -- OR -- HDFS 405: Aging & the Family
  - CGSC310: Orientation to Clinical Experiences: A hands on course that offers guided observation hours
  - Work in a lab for independent study credit. Here are some instructions for finding placement in a lab.
    1. Read about the research being done in various labs on campus by visiting faculty web sites in relevant department such as Psychology, Linguistics & Cognitive, and Physical Therapy.
    2. Contact several professors to ask if s/he has space for you to work in his or her lab for credit during the term of interest (fall, winter, summer, or spring). In your email, tell them about yourself (your major, your GPA, your professional goals) as well as the number of credits you would like to receive.
    3. Once you receive positive replies, pick a lab and sign up for an independent studies class with the professor under his or her home department. The number of credits will vary depending on the number of hours worked.

* Requires transportation for observation hrs