UNIVERSITY FACULTY SENATE FORMS

Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. A checklist is available to assist in the preparation of a proposal. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: _____Benjamin Bruening_____phone number__831-4096___

Department: Linguistics and Cognitive Science   email address: bruening@udel.edu

Date: _____**10-15-2012**_____

Action: _____**Request for permanent status for the BS in Cognitive Science**_____
(Example: add major/minor/concentration, delete major/minor/concentration, revise
major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

Effective term_____**13F**_____
(use format 04F, 05W)

Current degree__BS_____
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: ___BS_____
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name:_____no change_____
Proposed new name for revised or new major / minor / concentration / academic unit
(if applicable)

Revising or Deleting:

Undergraduate major / Concentration:____BS in Cognitive Science_____
(Example: Applied Music – Instrumental degree BMAS)

Undergraduate minor:_____
(Example: African Studies, Business Administration, English, Leadership, etc.)

Graduate Program Policy statement change:_____
(**Must attach** your Graduate Program Policy Statement)

Graduate Program of Study:_____
(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

Graduate minor / concentration:_____

Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.

List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?
(Be aware that approval of the curriculum is dependent upon these courses successfully passing through the **Course Challenge** list. If there are no new courses enter "None") **None**

Supply support letter from the Library, Dean, and/or Department Chair if needed
(all new majors/minors will need a support letter from the appropriate administrator.)

Supply a resolution for all new majors/programs; name changes of colleges, departments, degrees; transfer of departments from one college to another; creation of new departments; requests for permanent status. See example of resolutions. See attached.

Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education: http://www.ugs.udel.edu/gened/ See attached.

Identify other units affected by the proposed changes:
(Attach permission from the affected units. If no other unit is affected, enter "None")

None; the BS has been operating for five years.

Describe the rationale for the proposed program change(s):
(Explain your reasons for creating, revising, or deleting the curriculum or program.)

See attached.

Program Requirements:
(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the current curriculum and **include a side-by-side comparison** of the credit distribution before and after the proposed change.) **See example of side by side.**

See attached.

 ROUTING AND AUTHORIZATION: (Please do not remove supporting documentation.)

Department Chairperson _____ Date_____

Dean of College_____ Date_____

Chairperson, College Curriculum Committee_____ Date_____

Chairperson, Senate Com. on UG or GR Studies_____ Date_____

Chairperson, Senate Coordinating Com._____ Date_____

Secretary, Faculty Senate_____ Date_____

Date of Senate Resolution_____ Date to be Effective_____

Registrar _____ Program Code_____ Date_____

Vice Provost for Academic Affairs & International Programs_____ Date_____

Provost _____ Date_____

Board of Trustee Notification _____ Date_____

Revised 02/09/2009   /khs

Request for Permanent Approval of the BS in Cognitive Science, Faculty Senate Resolution

Department of Linguistics and Cognitive Science

October 15, 2012

WHEREAS,   the Department of Linguistics and Cognitive Science has been offering the BS in Cognitive Science for five years and the number of majors has grown from 15 to 195, and

WHEREAS,   Cognitive Science is a truly interdisciplinary study that meets all of the goals of undergraduate education and fits the Path to Prominence, and

WHEREAS,   the most prestigious universities in the nation offer degrees in cognitive science, and

WHEREAS,   students who have graduated with a BS in Cognitive Science have an excellent acceptance rate into graduate school, including in applied fields like speech/language pathology that will benefit the community, be it therefore

RESOLVED,   that the Faculty Senate permanently approves the establishment of the BS in Cognitive Science, effective September 1, 2013.

Request for Permanent Approval of the BS in Cognitive Science

Self Study Report

Department of Linguistics and Cognitive Science, November 13, 2012

1   General Information about the Program

1a. Introduction and History

The Department of Linguistics began offering a minor in Cognitive Science in the 1990s. Students were able to pursue a major in Cognitive Science as Liberal Studies majors and Dean's Scholars, and some of the brightest and most successful students at the University did so (including several Rhodes and Marshall Scholars). In Fall 2006, the Department submitted a proposal to establish a BS in Cognitive Science, and at the same time submitted a proposal to change the name of the Department to the Department of Linguistics and Cognitive Science. Both proposals were accepted, and the name change and the provisional establishment of the BS went into effect in Fall 2007.

In addition, prior to that time the Department organized an ad hoc program in pre-speech pathology. This program prepared students for entry into graduate professional school in speech language pathology and communication disorders. After the establishment of the BS in Cognitive Science, this ad hoc program became a formal track within the BS in Cognitive Science. The majority of the students majoring in Cognitive Science pursue the pre-speech pathology track.

The Department of Linguistics and Cognitive Science now offers a BS in Cognitive Science, a BA in Linguistics, minors in Cognitive Science and Linguistics, a PhD in Linguistics, and an MA in Linguistics and Cognitive Science. In addition, undergraduates can elect to enter a 4+1 program in either Cognitive Science or Linguistics, where they receive the MA degree in addition to either the BS in Cognitive Science or the BA in Linguistics. Students can also complete the BS in Cognitive Science or the BA in Linguistics with Honors.

1b. Academic Priorities of the University

Cognitive science studies the human mind viewed as a computational process. It lies at the confluence of computer science, educational and cognitive development, linguistics, neuroscience, neurobiology, philosophy, psychology, and certain areas of mathematics. Cognitive science has arguably been the most important development in the study of human thinking in the past twenty years; its influence can be seen across a wide variety of disciplines, from logic to communication disorders. As a discipline, cognitive science seeks to model and explain such phenomena as language, reasoning, and perception. The goal of cognitive science as a theoretical discipline is to determine those knowledge structures and processes that characterize organisms as biological information processing systems, as well as to explain how these organisms come to possess this knowledge. Applied cognitive science takes the results of this research to such diverse areas as language technology, cognitive approaches to education, human-computer interaction, etc. The latter field addresses the most effective use of technology

by people and includes the study of user interfaces, graphical displays, visualization of data, virtual reality, technology-based education, intelligent agents, and computer-based assistive technology for persons with disabilities.

As can be seen from this short description of cognitive science, its study is squarely in line with the academic priorities of the university. To pursue cognitive science is to strive to meet the goals of both the sciences and the humanities: to understand humans and their functioning as biological organisms. Students in the Cognitive Science BS learn to apply the scientific method to human cognition, to think critically to evaluate research from numerous subfields, and to do their own research on human cognition. In the applied area, the study of cognitive science fulfills the university's mission to improve the lives of everyone, including through improving methods of education.

1c. General Education Requirements

The major in Cognitive Science is ideally positioned to meet the general education goals for undergraduate programs, straddling as it does numerous disciplines within the university.

Goal 1. Attain effective skills in (a) oral and (b) written communication, (c) quantitative reasoning, and (d) the use of information technology. Numerous courses within the major regularly require students to present the results of research, their own or others, to the class. They also require written presentation of research results. Many individual courses are also writing intensive, such as the senior seminar. The major also requires at least one course in statistics, as understanding of such material requires statistical and quantitative reasoning. Students must also be able to do their own research, finding relevant publications and information, and so must learn to use information technology.

Goal 2. Learn to think critically to solve problems. Numerous courses also require students to critically evaluate the research results that they read and present. Many courses also assign regular problem sets, which require critical reasoning and problem-solving skills.

Goal 3. Be able to work and learn both independently and collaboratively. Numerous courses also assign projects some of which must be done individually and some of which must be done as a group.

Goal 4. Engage questions of ethics and recognize responsibilities to self, community, and society at large. The study of moral and ethical reasoning is in fact a sub-field of cognitive science. Ethics and bioethics, as part of philosophy, are also central to cognitive science. In addition, cognitive science requires students to compare human and animal cognition, cognitive development and abnormal development, cognitive decline, and other special populations. All of this requires students to confront issues of ethical and moral concern, and the applied fields of cognitive science directly address the responsibility of all to improve people's lives. Numerous courses within the major expose students to these ethical concerns and confront them directly.

Goal 5. Understand the diverse ways of thinking that underlie the search for knowledge in the arts, humanities, sciences and social sciences. As stated above, cognitive science is an interdisciplinary field of study, and students in the major take courses in anthropology, biology, computer science, linguistics, mathematics, philosophy, and psychology. These courses expose students to all of the diversity of these fields.

Goal 6. Develop the intellectual curiosity, confidence, and engagement that will lead to life-long learning. Humans are naturally fascinated by themselves. Most people are intensely interested in some of the most central questions of cognitive science, such as how we differ from other animals, and what we share with them; how the various cognitive faculties develop from infancy to adulthood;

how various cognitive processes might have evolved in human evolution; how male and female cognition might or might not differ; whether cognitive faculties like moral reasoning or language might differ from culture to culture; and so on. Scheduled talks on these topics always draw huge crowds, and these topics are regularly featured on radio and TV news reports. The BS in Cognitive Science not only exposes students to these topics, it teaches them to critically evaluate research that addresses them, and to pose new questions to ask.

Goal 7. Develop the ability to integrate academic knowledge with experiences that extend the boundaries of the classroom. Students in the major have numerous opportunities to pursue internships, clinical observations, and to work in various labs on campus. The track in pre-speech pathology requires a certain number of observation hours in a clinical setting, and courses are taught by practicing clinicians. Students in other tracks can and do work with children in experimental settings, run neurological experiments, and pursue other lab-based experiential research.

Goal 8. Expand understanding and appreciation of human creativity and diverse forms of aesthetic and intellectual expression. Again, students in the major take courses in anthropology, biology, computer science, linguistics, mathematics, philosophy, and psychology. These courses expose students to all of the diversity of these fields. Many students also find themselves interested in music cognition or artistic cognition, and can pursue these interests with faculty members.

Goal 9. Understand the foundations of United States society including the significance of its cultural diversity. Linguistics 101, a course required of all majors, directly addresses linguistic diversity in the United States. Other elective courses do the same. As a practical matter, students pursuing the pre-speech pathology track (the majority of them) must understand sociological differences among linguistic groups in order to understand pathology and to clinically diagnose and treat it. As another example, many students are interested in deaf communities and deaf education within the United States, and learn about the culture and language of those communities.

Goal 10. Develop an international perspective in order to live and work effectively in an increasingly global society. Linguistics 101, a course required of all majors, also directly addresses linguistic diversity across the globe and the issue of language endangerment and death. Other courses explore possible connections between culture and cognition, including in cognitive development and cultural educational and child-rearing practices.

1d. Curricular Requirements

The breadth requirements for the major were just changed this year (see below). Previously students had to fulfill all college and university breadth requirements as well as all other college and university requirements. The following are the current requirements:

University Requirements

1. A scholastic average of C (GPA of 2.0) in all work taken at the University.

2. Completion of either 90 of the first 100 credits or 30 of the last 36 credits, full- or part-time, at the University of Delaware.

3. All students are required to complete a minimum of 12 credits from the list of University breadth courses. This includes 3 credits from each of the following categories, earning a minimum grade of C- in each course to meet this requirement:

    (a) Creative Arts and Humanities

(b) History and Cultural Change

(c) Social and Behavioral Sciences

(d) Mathematics, Natural Sciences, and Technology

4. One incoming semester of First Year Experience (FYE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. The number of credits will depend on the designated FYE.

5. One semester of Freshman English (ENGL 110), completed with a minimum grade of C-.

6. Three credits of Discovery Learning Experience (DLE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. DLE includes experiences such as internship, service learning, independent study, undergraduate research, and study abroad, which are designated DLE.

7. Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender related content. The purpose of the multicultural requirement is to provide students with some awareness of and sensitivity to cultural pluralism-an increasing necessity for educated persons in a diverse world. This requirement may be fulfilled through a course or courses taken to complete other course requirements, but cannot be fulfilled with any course taken on a pass/fail basis. Only course sections that are designated as multicultural in the registration booklet for a specific semester can be used to fulfill this requirement.

College Requirements

1. Second Writing Requirement: (minimum grade C-) A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content. This course must be taken after completion of 60 credit hours. Appropriate writing courses are designated in the semester's course offerings. Only the specific sections designated within each academic term will satisfy the second writing requirement. Please check the UDSIS registration system to ascertain whether a particular course section will be offered as as second writing course.

2. Mathematics: Complete one of the following four options. (minimum grade D-)

   (a) OPTION ONE:
   MATH 113 Contemporary Mathematics (designed for students who do not intend to continue the study of mathematics)

   (b) OPTION TWO:
   MATH 114 College Mathematics and Statistics (designed for students who do not intend to continue the study of mathematics) or
   MATH 115 Pre-Calculus (designed for students who intend to continue the study of mathematics) or
   MATH 117 Pre-Calculus for Scientists and Engineers (designed to prepare students for MATH241)

   (c) OPTION THREE:
   Successful completion of any mathematics course at or above the 200-level except MATH

201, MATH 202, MATH 205, MATH 250, MATH 251, MATH 252, MATH 253, MATH 266, or MATH 450.

(d) OPTION FOUR:
Successful performance on a proficiency test in mathematics administered by the Department of Mathematical Sciences.

The math requirement must be completed by the time a student has earned 60 credits. Students who transfer into the College of Arts and Sciences with 45 credits or more must complete this requirement within two semesters.

3. Foreign Language: (minimum grade D-) Completion of the intermediate-level course (107 or 112 or 214) in an ancient or modern language. The number of credits needed and initial placement will depend on the number of years of high school study of foreign language. Students with four or more years of high school work in a single foreign language, or who have gained proficiency in a foreign language by other means, may attempt to fulfill the requirement in that language by taking an exemption examination through the Foreign Languages and Literatures Department.

4. College Breadth Requirements: 18 credits total, with a minimum of 6 credits each in Groups A, B, and C.

Department Requirements

Required courses	(26 hours/credits)	Credits
All of the following:		
CGSC 100	First Year Experience	1
CGSC 170	Introduction to Cognitive Science	3
PSYC 314	Brain and Behavior	3
CGSC 485	Seminar in Cognitive Science (senior seminar)	3
LING 101	Introduction to Linguistics	3
PSYC 100	General Psychology	3
One of the following:		
BISC 104	Principles of Biology with Laboratory	4
BISC 207	Introductory Biology I	4
One of the following:		
CISC 103	Introduction to Computer Science with Web Applications	3
CISC 108	General Computer Science	3
CISC 181	Introduction to Computer Science II	3
CISC 280	Program Development Techniques	3
One of the following:		
PHIL 205	Logic	3
MATH 201	Introduction to Statistical Methods I	3
MATH 205	Statistical Methods	4
PSYC 209	Measurement and Statistics	3

In addition, students must complete at least an additional 18 credit hours in a concentration. Students can design their own concentration in consultation with an advisor, or choose from the pre-approved concentrations listed on the Department's website at:

- http://www.ling.udel.edu/ling/concentrations.html

1e. Assessment

The department has created the following assessment materials:

1. Mission statement that includes learning outcomes for the CGSC major (available at
   http://www.ling.udel.edu/bs-cognitive-science.html).

2. Curriculum map for the CGSC major. This maps the relationship between our learning outcomes and the required courses for the major (available at
   http://www.ling.udel.edu/sites/ling.udel.edu/files/Curriculum_Map_PDF.pdf).

3. Syllabi for UG offerings in LING and CGSC are posted on the departmental web site (under missions and goals, CGSC major). Each syllabus contains the programmatic learning outcomes as well as the learning goals for the particular course.

4. Two methods of assessment:

   (a) Primary Assessment Method (supporting documents available). In the Primary Method, programmatic learning outcomes are assessed in the senior seminar. This is a capstone course that all Cognitive Science majors must take at or near the end of the major. It is also a second writing course, which means that it involves multiple writing assignments, with detailed written or oral comments from the instructor. Because cognitive science is an interdisciplinary field that applies different disciplinary approaches (such as linguistics, psychology, computer science, philosophy and biology) to the study of mind, many of the courses required for this major explore the mind from the perspective of a single discipline. The senior seminar provides an opportunity for students to synthesize what they have learned in their previous coursework by bringing together some of these divergent methodologies and applying them to a single topic or set of topics. Writing assignments require students to read and critically assess primary source scientific articles on a specific topic (such as language and cognition). Each student works towards an interdisciplinary final paper on a topic of his or her choice. Student papers are evaluated according to the criteria listed below each learning goal. These criteria are reflected in a rubric that the instructor uses to assess student papers (assessment rubric available).

   (b) Second Assessment Method (supporting documents available). The second method is an exit survey concerning course offerings. The goal is to make sure that our course offerings allow students to be well-prepared for the graduate programs that they want to pursue. The exit survey was only used once, because we got very few responses. Placement data (see section 2) indicate that our program is very successful.

In actual practice, none of these assessment methods have yet led to any changes in the program. The reason for this is that the need for changes arose independently of assessment. These reasons (discussed in section 1) were (1) that we needed to make sure that the students in the pre-speech pathology concentration could get the courses they needed to get into a good graduate program (based on consultation with experts and successful graduates); (2) that we needed to streamline student advising; and (3) that we needed to make it easier for students to get through the major in a timely fashion.

As an example of the latter, we lowered the breadth requirements to be in line with other BS degree programs, since students were having difficulty fulfilling all of the breadth requirements.

This means that we have been making changes to the program in order to improve the program and to improve student outcomes (in particular, ensure students get into graduate school), meaning that we have been striving to meet the goals of assessment. The fact that the actual assessment materials we created have not proven useful so far in doing this is immaterial.

1f. Student Advisement

The Department's strategies for student advisement include several advising forms for use by the students and faculty advisors, and policies and procedures for new students declaring the major and for ongoing advising for continuing students.

Advising Forms. These forms are updated every semester for accuracy and are available for download on our departmental web site. Hardcopies are also available in the Department. These include:

1. CGSC Major Requirements
   This form summarizes all of the requirements for the CGSC major. It also includes the College of Arts and Science and the University requirements for completing a B.S. degree.

2. Progress and Planning form for the Cognitive Science Major
   This form is used to track a student's progress through the major. It too includes the College of Arts and Science and the University requirements for completing a B.S. degree.

3. University and College Requirements, CGSC BS.

Procedure for Students Entering Major: When a student enters the major, he or she is assigned a primary advisor. At this time, the student receives a copy of the Progress and Planning form for the Cognitive Science major and is asked to complete this form and return it—along with any questions he or she may have—to his or her primary advisor. The student is also directed to other advising forms available on the departmental web site. Once a student has completed this form, it is reviewed for accuracy and to make sure that the student will be on track towards graduation. Feedback is given in person (one on one advising session), or via other means.

Freshman majors also receive advising in their new student orientation, which typically occurs the day before classes start. In addition, they have two advising sessions in the CGSC100: Freshman Year Experience Course. One is run by the departmental liaison in academic services (currently Sarah McCowan). The other is run by the director of the undergraduate program for the CGSC major (currently Robin Andreasen). These two sessions occur a week or two before registration for the spring semester of their freshman year.

Ongoing Advising: Students continue to receive advising throughout their time in the CGSC major. A few weeks before the start of registration for each semester, the Department holds a series of evening advising sessions open to all majors. Students who cannot attend these sessions or who would like one-on-one assistance receive it through advising appointments or other means of communication. Students must complete (or update) a Progress and Planning form for the CGSC major before any advising session. This helps to ensure that they are engaging in their academic planning and that they are prepared for advising meetings.

Primary advisors are expected to help the students select classes in a way that will keep students on track toward graduation. They are also available as mentors; i.e., to suggest extra courses, work experience, lab experience, etc. that a student might need to be successful post-graduation.

Results of advising communications are recorded in advising notes.

Additional Resources: In addition to faculty advising, additional resources are available to students in the CGSC major, especially those in the pre-speech pathology concentration. (Note: Roughly 80% of our majors are in this concentration). These are not replacements for faculty advising; rather, they supplement faculty advising.

1. UD Chapter of National Student Speech Language and Hearing Association (NSSLHA) NSSLHA has regular meetings. They provide students with information on how to gain experience outside the classroom. They also run an advising session each semester. Dr. Andreasen (director of the CGSC undergraduate program) works closely with the students in NSSLHA and is present at the NSSLHA-run advising sessions.

2. New this Semester: A workstudy student, a senior in the major, acts as an informal mentor to students new to the major. This student is there to answer very straightforward questions about the major and to give incoming students an opportunity to hear about the major from a student's perspective. Dr. Andreasen was involved in choosing the student and is working very closely with her.

In addition, several people outside the Department help to provide our students with invaluable advising. Dr. Beth Mineo, whose primary appointment is in Education and Human Development, works closely with students in the pre-speech pathology concentration. Our Department also works closely with our liaison in Academic Services, currently Sarah McCowan.

Finally, Dr. Andreasen reports any discrepancies found in UDSIS to Naomi Nash, so as to make this aspect of advising more accurate.

1g. Accreditation

Not applicable.

1h. Changes to the Program

As mentioned above, several changes have been made to the BS in Cognitive Science.

1. The program originally had a GPA requirement for admission into the major, but this requirement was dropped when the university eliminated all such entrance requirements.

2. In 2011, the Department submitted a change to the breadth requirements in the program. This was approved for Fall 2012 and has now taken effect. Briefly, the BS in Cognitive Science previously required fulfillment of the same breadth requirements as BA degrees generally within the College of Arts and Sciences: 9 hours in Group A, 9 hours in Group B, 9 hours in Group C, and 10 hours in Group D. BS degrees typically reduce the number of breadth requirements because they have many more major requirements. The BS in Cognitive Science is no different in this respect from other BS programs: the major requirements are extensive. The most popular concentration, speech/language pathology, requires at least 53 credit hours in the major. Because the major requirements are so heavy, the general BA breadth requirements were causing

students difficulties in completing their requirements for graduation. These breadth requirements were also out of line with other BS programs in the College, which require 18–24 credit hours total, not 37. Moreover, the study of Cognitive Science is inherently interdisciplinary, meaning that students pursuing the BS attain a lot of breadth simply by completing the major requirements. For these reasons, the breadth requirements for the BS in Cognitive Science were changed to be identical to those of the BS in Psychology: 6 hours in Group A, 6 hours in Group B, and 6 hours in Group C (18 credit hours total).

In addition to these two changes, the Department regularly reviews the concentration requirements and updates them to reflect the needs of the students. For example, the pre-speech pathology concentration requirements have been changed several times to reflect the changing demands of graduate programs.

1i. Recruiting

The Department's recruiting efforts are primarily limited to avenues provided by the University, such as the spring Blue and Gold days. While some may consider these efforts minimal, it is important to recognize the growth of the undergraduate program has been remarkable and there has been little need for active recruitment beyond word-of-mouth.

2 Student Information

2a. Application and Enrollment History

As can be seen in the following table, the BS in Cognitive Science has been growing steadily. We began with 15 majors in 2007, and currently have 195. 54 students are expected to graduate in Spring 2013.

Semester	Number in Major	Honors	Number Graduated
2007 Fall	15	3	
2008 Spring	18	6	
2008 Fall	37	9	
2009 Spring	44	10	3 (+1 in summer)
2009 Fall	60	10	
2010 Spring	72	12	20 (+1 in winter)
2010 Fall	113	18	2
2011 Spring	131	20	18 (+1 in winter, 2 in summer)
2011 Fall	155	21	1
2012 Spring	173	25	17
2012 Fall	195	26	
2013 Spring			54 expected

In addition, the Department offers a 4+1 program. Students can get the BS in Cognitive Science and an MA in Linguistics and Cognitive Science in five years total, rather than the usual four for the BS plus another two for the MA. Several students have already completed this 4+1 program:

1. Edie, Carolann, BS and MA completed 2009S

2. Wilder, Robert Jonathan, BS and MA Completed 2009S

3. Kurban, Elizabeth, BS and MA completed 2011S

4. Soloman, Sarah, BS and MA completed 2011F

2b. Placement of Graduates

The following table presents data regarding placement of graduates from the BS program in Cognitive Science. The data are more complete for the most recent two years, and less complete for earlier years.

As can be seen, the vast majority of students who graduate with a BS in Cognitive Science go on to graduate school (37 out of the 41 we have information for, or 90%). Most of these pursue master's degrees in speech/language pathology.

The department does a number of things that facilitate placement of graduates. First and foremost are the opportunities for experiences outside the classroom. Students take part in clinical observations and internships. These make them very attractive to graduate programs (especially in speech pathology) and also prepare them for future careers. Students also pursue independent study and do research in various labs. These experiences again make students more attractive to graduate programs. In addition, the department helps prepare students for application to graduate school through advisement. Faculty members advise students on applying to graduate schools. Faculty members also attend sessions on applying to graduate schools that are run by the student organization NSSLHA. Students who attend these sessions receive valuable advice from other students, including students who have successfully attained admission to graduate programs.

2009–2010	Total Graduates for Academic Year = 21
Student 1	Completed masters in speech language pathology at Adlephi University. She is now working in queens, NY at a clinic as a speech language pathologist completing her clinical fellowship year.
Student 2	Currently teaching English in Madrid Spain, with TEFL certification. She has been accepted to a speech and language pathology graduate program at the Universitat de VIC in Barcelona.
Student 3	Completed MA program at Kean University for Speech-Language Pathology. Is now working at a school for students with autism as a full time speech language pathologist.
Student 4	Completed masters in speech pathology from CUNY Hunter. Currently working as full time speech and language pathologist.
Student 5	Completed masters in speech pathology from Hofstra University. Currently working as full time speech language pathologist.
Student 6	Completed masters in speech pathology from CUNY Hunter. Currently working as full time speech and language pathologist.
Student 7	Completed MS in speech pathology from William Paterson. Currently working as full time speech pathologist in the public school system of New Jersey.
Student 8	Completed masters in speech pathology from Towson University. Currently working on clinical fellowship in speech and language pathology.

2010–2011	Total Graduates for Academic Year = 23
Student 1	Currently at Towson University for MA in speech pathology.
Student 2	Currently teaching English to elementary and middle school children in southern Japan.
Student 3	This year's recipient of the Robert J. Currently at CUNY Hunter for MA in speech pathology in addition to a Teacher of Students with Speech and Language Disabilities Certification.
Student 4	Curently at C.W. Post Long Island University for MA in speech pathology.
Student 5	Curently at Seton Hall University for MA in speech pathology.
Student 6	Currently teaching second grade at Christ the Teacher Catholic School in Bear and pursuing her masters in Special Ed. from Wilmington University
Student 7	Currently at Montclair State for MA in Communication Disorders.
Student 8	Currently at Montclair State for MA in Communication Disorders.
Student 9	Currently at SUNY, Buffalo for MA in speech pathology.
Student 10	Currently at Towson University for MA in speech pathology.
Student 11	Currently at Richard Stockton College of NJ for MA in speech pathology.
Student 12	Completed MA in LING through 4+1 program at UD. Degree conferred 2011S. Currently at University of Pennsylvania for M.S.ED in Higher Education Administration.
Student 13	Currently at Adelphia University for MA in speech pathology.
Student 14	Currently at Hunter College for MA in speech pathology.
Student 15	Currently at Temple University for MA in speech pathology.
Student 16	Currently at Mercy College for Masters in communication disorders.
Student 17	Currently at St. John's, New York for MA in speech pathology.
Student 18	Currently at West Carolina University, Masters program in speech and language pathology.
Student 19	Currently at Loyola University for MS in speech-language pathology.
Student 20	Currently at at the University of Rhode Island seeking MA in Communication Disorders.

2011–2012	Total Graduates for Academic Year = 18
Student 1	Currently working towards her masters in school counseling at C.W. Post.
Student 2	Currenty in graduate school for an MBA at Wilmington University.
Student 3	Currently in graduate school for MA in speech pathology at Long Island University.
Student 4	Currently working professional job in software development.
Student 5	Currently in graduate school for a PhD in Developmental Psychology, Duke University.
Student 6	Currently in graduate school for her MA in speech pathology at Loyola University, MD.
Student 7	Currently in graduate school for MA in speech pathology at CUNY Lehman College.
Student 8	Currently in graduate school for her MA in speech pathology at Loyola University, MD.
Student 9	Currently employed at NHS human services as a DSP (direct support professional) for individuals with disabilities that live in group homes. She is also going back to nursing school in the fall of 2013.
Student 10	Currently in graduate school for an MA in speech pathology at Northeastern.
Student 11	Currently working at Medstar Washington Hospital Center in Washington, DC. screening newborn hearing in the well baby and NICU nurseries. She plans to go to graduate school next year or the following to earn a masters in either Audiology or Speech-Language Pathology.
Student 12	Graduate school for an MA in speech pathology at CUNY Lehman.
Student 13	Completed MA in LING, through 4+1 program. Degree conferred 2011F. Currently in 2 year position as a Research Specialist in Dr. Sharon Thompson-Schill's Cognitive Neuroscience Lab at the University of Pennsylvania. She plans to apply to PhD programs at the end of the position.

3 Demand and Competitive Factors

Focusing first on the popular pre-speech pathology concentration, we note that there are no in-state professional programs in speech/language/hearing science in Delaware, and therefore no universities with either undergraduate or graduate programs in speech pathology. As such, the University of Delaware does not compete in the region for this kind of study, as it is the only institution offering it. As witnessed by the recent State Legislature interest in establishing a professional master's degree in speech/language pathology, there is a very high interest in and demand for speech pathology. This demand was confirmed by the task force that was charged with studying the feasibility of establishing a graduate program. Interest among undergraduate students is also attested by the rapid growth of the program, from 15 majors in 2007 to 195 today. The majority of these (approximately 80%) are in the pre-speech pathology concentration.

Regarding cognitive science more generally, there are still relatively few universities in the nation that offer degrees in cognitive science, although many prominent research universities have established cognitive science programs (UPenn, Brown, Johns Hopkins, MIT, UCSD, UCI, Washington University, and others). The University of Delaware has little competition at the undergraduate level in the region (UPenn, Johns Hopkins, Lehigh University), and is the only institution to offer this de-

gree in Delaware. Demand for cognitive science separate from speech pathology is much lower, but the discipline does attract some of the best and brightest students, as witnessed by the number who have received Rhodes and Marshall Scholarships in the past, as well as Warner and Taylor awards (best female and male student). Since the most prominent universities in the nation have cognitive science programs, and cognitive science is attractive to the brightest students, the University of Delaware needs to have a cognitive science degree in order to remain competitive at the national level, and to proceed further along the Path to Prominence.

4   Distinctive Characteristics of the Program

The BS in Cognitive Science at the University of Delaware is unique and distinctive in that it has a popular speech pathology concentration. This concentration is not a pre-speech/hearing science program per se, but rather a broader program with an emphasis on basic science. As such, students who graduate from this program have a stronger background in theoretical linguistics and general cognitive science than most other applicants to professional speech pathology programs. Students doing cognitive science and not speech pathology take a wide variety of courses from different departments.

Students in Cognitive Science also receive a lot of individual attention. Several faculty members regularly advise independent study students, and others run a CGSC internship course. We are currently discussing making this a regular special sessions offering. One faculty member has co-authored publications with undergraduate students, while other students have worked with faculty on projects funded from outside sources.

Students in Cognitive Science also benefit from numerous clinical and laboratory experiences. Speech pathology students have been getting 25 hours of clinical observation in their classes, which allows them to meet the requirements for ASHA certification before they even get to graduate school. Many students also get additional experience outside of the classroom, through independent study courses or internships. For example, many students volunteer or intern at the Mary Campbell Center, the Delaware Autism Program, the Delaware School for the Deaf, AI Du Pont Children's Hospital, and Easter Seals, to name a few. Many students also work in the laboratories run by the Department, the Psycholinguistics Lab and the Phonology and Phonetics Lab. Some also work in labs run by affiliated faculty in other departments, for instance Roberta Golinkoff's Infant Language Project (Education) and Anna Papafragou's Language and Cognition Lab (Psychology).

Additionally, Cognitive Science students benefit from interaction with instructors and researchers who are not regular faculty members in the Department of Linguistics and Cognitive Science. For instance, the Department collaborates with several researchers from AI Du Pont Hospital, such as Linda Vallino, Tim Bunnell, Nina Straitman, Kyoko Nagao, and Thierry Morlet. Some of these regularly teach undergraduate courses and work with students in the BS program. Additionally, practitioners from Christiana Care also teach courses and work with undergraduates, like Dale Gregore and Christine Virion.

5   Interdisciplinary Relationships

Cognitive science is by its very nature interdisciplinary. Students are required to take courses in Psychology, Biology, and Computer Science and Statistics, in addition to Cognitive Science and Linguistics. In addition, they may take courses in Anthropology and Philosophy. In addition to this breadth, Cognitive Science bears the strongest relationship to cognitive psychology. Indeed, many Cognitive

Science majors choose to minor in Psychology and therefore take electives from that program. Other popular minors (and therefore electives) are Human Development and Family Studies, Education, and Disability Studies. Other students choose to minor in Foreign Languages or Linguistics. Some students who plan to go to graduate school for speech/hearing science also take courses in the physical sciences, to meet school-specific entrance requirements. All students who major in Cognitive Science end up taking courses across many different departments and even colleges.

6   Facilities

With the Department's relocation from 42 and 46 E. Delaware Avenue to 125 Main Street in summer 2012, the facilities available for the program have become adequate.

The Department runs three lab spaces:

1. The Psycholinguistics Lab (0125 McKinly)

2. The Phonology and Phonetics Lab (0064 McKinly)

3. The Experimental Workstation (room 112, 125 Main Street)

The Psycholinguistics Lab is run by Dr. Arild Hestvik and the lab suite consists of an ERP recording room with a state-of-the-art 128 channel EEG acquisition system (Electrical Geodesics system 300), and an 8"x10" sound- and electrically-shielded IAC booth for protected data collection. The main room (125) houses workstations for data analysis and experiment development, subject recruitment area, computer for subject scheduling, a behavioral experiment station, and is also a conference room.

The Phonology and Phonetics Lab is run by Dr. Jeffrey Heinz and the lab contains a 6"x6" sound-attenuating booth, workstations for data analysis and experiment development, and a conference area.

The Experimental Workstation contains two small rooms, each with a workstation for data analysis and experiment development.

The relocation increased the square footage of the department by approximately 2,500 square feet. This additional space provides adequate meeting space between non-full-time instructors (such as visiting professors, S-contracts) and TAs and their students in offices or small rooms.

7   Other Budgetary Requirements

The current size of the program has produced great strain on the Department's administrative and staffing resources. One person is dealing with all of the increased administrative activity that comes with the undergraduate program, including additional course scheduling, handling simple advising questions from students and fielding calls from parents, and so on. Consequently other important administrative functions (department budgeting, course scheduling, faculty grant submissions, etc.) are further strained. While the Department's budgetary requirements do not exceed the expenses of typical units, the Department's current budgetary allotment for staff is below the level of typical and comparable units. The Department is in urgent need of additional staffing.

8   Other Information

As can be seen in the Student Information section, a significant number of students in Cognitive Science have been Honors students (currently 26 out of 195, or 13.3%). The Department has recently

made some changes to help support Honors students. First, the Department has appointed a dedicated advisor to the Honors students, who is also the Department's liaison with the University Honors Program. Second, the Department has now made it possible for undergraduate Honors students to enroll in the 600-level section of 400/600-level courses and thereby get Honors credit for the course. Previously students had to arrange Honors add-on sections or individual contracts, as only two courses (LING 101 and CGSC 170) are regularly offered as Honors courses. This change will make it easier for students to get the Honors courses that they need in the major.

Finally, there is a campus chapter of the National Student Speech-Language Hearing Association (NSSLHA) at the University of Delaware. This is a student-run organization that organizes volunteer opportunities and runs charity drives. It also has a mentor program for incoming speech pathology students, who are the majority of the majors in Cognitive Science. NSSLHA also runs an advising session on applying to graduate school, and they also have a speaker series. This organization is a real resource for students in Cognitive Science at the University of Delaware.

<u>Resolution from the Faculty Senate April 2007</u>

Recommendation from the Committee on Undergraduate Studies (Amy Johnson, Chair) with the concurrence of the Coordinating Committee on Education (Alan Fox, Chair) and the Executive Committee (Dallas Hoover, Chair) for the request to add a new BS major in Cognitive Science in the Department of Linguistics ([attachment)](#) ([attachment](#))

> Whereas,   the establishment of the Bachelors of Science: Cognitive Science degree would benefit students in the Department of Linguistics and Cognitive Science, and

> Whereas,   the establishment of this degree has been endorsed by the Senate of the College of Arts and Sciences and the Undergraduate Studies Committee of the Faculty Senate, and

> Whereas,   establishment of such a degree does not require the addition of any new courses beyond those that the Department plans to offer, and

> Whereas,   establishment of such a degree does not require the addition of any library resources, be it therefore

Resolved,   that the Faculty Senate recommends that this degree be established in the Department of Linguistics and Cognitive Science.

Proposal for a B.S. in Cognitive Science

I. Introduction

This is a proposal for the establishment of an undergraduate major (B.S.) in cognitive science at the University of Delaware. The degree will be housed in the Department of Linguistics and Cognitive Science. The Department of Linguistics is currently in the process of changing its name to the Department of Linguistics and Cognitive Science. This name change is dealt with in a separate document. The Department of Linguistics is currently the academic home for the M.A. in Linguistics and Cognitive Science and for the undergraduate Minor in Cognitive Science and the Minor in Linguistics. The proposed B.S. is intended to bridge the gap between the Minor in Cognitive Science and the M.A. in Linguistics and Cognitive Science.

The major is designed to capitalize on existing faculty research and teaching strengths and to provide a formal curriculum and degree in one of the most influential new fields of study. Moreover, specialized concentrations in such sub-areas of speech science and linguistic science will meet the needs of a potentially significant number of students not currently served by an existing University curriculum.

II. Rationale and Demand

1. Institutional Factors

Cognitive science studies the human mind viewed as a computational process. It lies at the confluence of computer science, educational and cognitive development, linguistics, neuroscience, neurobiology, philosophy, psychology, and certain areas of mathematics. Cognitive science has arguably been the most important development in the study of human thinking in the past twenty years; its influence can be seen across a wide variety of disciplines, from logic to communication disorders. Numerous other schools have had the foresight to establish formal programs in the area (e.g., Brown, Johns Hopkins, MIT, UCSD, UCI, Washington University, among others), and we propose to follow suit.[1]

As a discipline, cognitive science seeks to model and explain such phenomena as language, reasoning and perception. The goal of cognitive science as a theoretical discipline is to determine those knowledge structures and processes that characterize organisms as biological information processing systems, as well as to explain how these organisms come to possess this knowledge. Applied cognitive science takes the results of this research to such diverse areas as language technology, cognitive approaches to education, human computer interaction etc. The latter field addresses the most effective use of technology by people and includes the study of user interfaces, graphical displays, visualization of data, virtual reality, technology-based education, intelligent agents, and computer-based assistive technology for persons with disabilities.

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[1]   Program descriptions for a number of these programs are provided to allow comparison of the proposed UD program and that at other universities.

The University of Delaware has a number of faculty members with strengths in both applied and theoretical cognitive science (see section V). For years, an informal research group has met regularly to discuss recent research in Cognitive Science, and the Program in Cognitive Science has offered a stimulating program of lectures to student body, public and faculty. At present, however, there is little in the way of formal educational opportunities for undergraduate students to pursue this cross-disciplinary study. There is a minor in cognitive science (administered by the Department of Linguistics), but, as a minor, this option remains a secondary choice to students and not the focus of significant curricular development. There is no available formal program for speech science—a natural preliminary for graduate study in speech pathology as well as a natural offshoot of applied cognitive science—even as a minor area of study. While the Department of Linguistics has provided a curriculum for students interested in preparing for graduate work in speech pathology and language pathology, this has been handled in an ad hoc fashion and, therefore, has not fully met the needs of the students or of the State of Delaware. We propose to correct these problems through the creation of a new undergraduate major in cognitive science.

2. Student Demand and Employment Factors

A B.S. in cognitive science can have great impact at the undergraduate level, where it can feed into a variety of professional careers (e.g., cognitive engineering, user interface design) and graduate programs (e.g., computer science, education, linguistics, psychology, philosophy, speech pathology and cognitive science graduate programs). Graduate opportunities in cognitive science are already in place to a great extent. The Department of Linguistics offers an M.A. in Linguistics and Cognitive Science. The Doctoral programs of three departments, Linguistics, Psychology and Computer and Information Science offer the possibility of Doctoral programs encompassing major aspects of cognitive science. Thus, while we plan to revisit in the future the question of whether a stand-alone Doctoral program in cognitive science should be offered, our immediate concern is in providing opportunities to UD undergraduates.

The relationship between cognitive science and graduate speech pathology is particularly important for the establishment of this degree at Delaware. The need for speech pathologists in the state is evidenced by the availability of public support dollars for graduate students who agree to work in Delaware after finishing their degrees. Nonetheless, with the exception of the ad hoc program currently offered by the Department of Linguistics, the University does not currently provide any formal curriculum for students planning to enter graduate school in speech pathology. We hope to remedy that deficit with this program.

III. Enrollment, Admissions and Financial Aid

1. Enrollment
There are currently about 30 students in the ad hoc pre-graduate speech pathology program organized by the Department of Linguistics. The number of students that we agree to allow into this informal program has been artificially limited, so we anticipate the demand by qualified students to be initially about 20 students per year (a conservative estimate). In addition, the Department receives about 15 inquiries a year by students not considering a career in speech

science who would like to major in cognitive science. So far, most of these inquiries have been from current UD undergraduates, but with publicity there could easily be an additional 15-25 students per year applying for the program from outside the University. Thus, we estimate that within a short while the number of majors enrolling each year will be at least 35, and perhaps as many as 50.

We would like to emphasize, however, that the major reason to initiate the program is not because it will draw large numbers of students. Rather, we envisage this program as an attraction that will draw superior students to Delaware. As a discipline, cognitive science has been attractive to many of the very best students in the University. Of the students who have constructed a major in Cognitive Science as Liberal Studies majors and Dean's Scholars, a disproportionate number have received Rhodes and Marshall Scholarships, Warner and Taylor awards (best female and male student) etc. Among such students are the following:

Douglas Mauro de Lorenzo (B.A. 1998, Rhodes Scholar and Taylor Award; M.A. Linguistics; currently a Ph.D. candidate in refugee studies at Oxford)

Matt Huenerfauth (B.A. 2001, Marshall Scholarship [declined in favor of Mitchell Scholarship]; George Mitchell Scholarship; Minor in Cognitive Science, M.A. University of Dublin; currently a Ph.D. candidate in artificial intelligence at U Penn)

Thomas Pellathy (B.A. 2000, Rhodes Scholar and Taylor Award; M.A. Linguistics; currently a Ph.D. candidate at Oxford)

Katherine Wong (1999 Warner Award, RA on Linguistics NSF project & MA student in Linguistics; currently a professional musician in New York)

In addition to serving students already on campus, this program is being created to attract to Delaware students like the above and to provide exciting but structured opportunities for such students. The Department is less concerned with reaching particular enrollment goals than with maintaining the highest academic standards and attracting the most academically able students.

2. Admission Requirements
It is anticipated that most graduates of the program will seek postgraduate training in order to satisfy their professional aspirations. In order to ensure that students interested in cognitive science, and related fields like linguistics, speech science and speech pathology and other areas as well, will be admitted to the best graduate schools, students will only be formally admitted to the program based on their college GPA. During the freshman year students may declare a Cognitive Science Interest Major, but admission to the program as a Cognitive Science Major requires the completion of at least 30 credits of study. The minimal GPA for admission to the program will be 3.0. Once in the program, students whose current (not cumulative) GPA for required courses and courses with CGSC and LING designations falls below 3.0 will be placed on probation. If the current GPA for required courses and courses with CGSC and LING

designations is not raised to 3.0 by the end of the following semester, they will be dropped from the major.

IV. Curriculum Specifics

1. Institutional Factors

The Degree to be awarded is the bachelor of science (B.S.) in cognitive science. We are proposing a B.S. rather than a B.A. because, in order to achieve sufficient interdisciplinary coverage and specialization, this program requires 124 credit hours with at least 43 credits in the major. For a significant number of students it will be necessary for the major to consist of 50 credit hours or more. In contrast, the B.A. typically requires 30-35 credits in the major and no more than 45 credits are permitted. Thus, the degree of bachelor of arts is not appropriate for this major.[2] Students will also have to meet University and College requirements as specified below. As is usual for B.S. degrees, the requirements are tailored to meet the needs of the curriculum.

2. Description of Curriculum

a. Core requirements

At the foundation of the major is the introductory survey course in cognitive science, which has heretofore been taught within the Department of Linguistics. Further, all majors will be required to do work in the contributory subfields and methodologies of the cognitive sciences. This is a feature of the existing minor that we bring unchanged into the major. The specific course distribution and requirements for this "core curriculum" are as follows:

Required Courses (25 hours/credits)

All of the following:

CGSC 270   Introduction to Cognitive Science (foundation course)   3 hrs

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[2]   At the University of Delaware the designation of "B.S." indicates that a program is highly focused rather than that it is one that is based primarily on laboratory science courses. Examples of B.S. programs at UD that do not require a large component of laboratory science courses are International Business Studies, (which focuses on advanced language skills and international area studies to accompany business courses), marketing and other business majors; Elementary teacher Education, Early Childhood Education and other education majors; Apparel Design/Fashion Merchandising, Hotel, Restaurant and Institutional Management, Human Services, Education and Public Policy, Leadership and many others (see the current catalog). What these programs have in common is that their requirements are more focused than those of B.A. programs.

While the proposed B.S. in Cognitive Science is by nature in fact more science oriented than many of the above B.S. degrees, the choice of the B.S. rather than the B.A. is motivated by the need to allow greater focus than is possible in B.A. degrees rather than by the science orientation of the degree.

CGSC 314	Brain and Behavior	3 hrs
CGSC 485	Seminar in Cognitive Science (senior seminar)	3 hrs
LING 101	Introduction to Linguistics	3 hrs
PSYC 100	General Psychology	3 hrs

and

One of the following:

BISC 104	Principles of Biology with Laboratory	4 hrs
or		
BISC 207	Introductory Biology I	4 hrs

and

One of the following:

CISC 105	General Computer Science	3 hrs
or		
CISC 103	Introduction To Computer Science with Web Applications	3 hrs
or		
CISC 181	Introduction to Computer Science	3hrs
or		
CISC 280	Program Development Techniques	3 hrs

and

One of the following:

PHIL 205	Logic	3 hrs
or		
MATH 201	Introduction to Statistical Methods I	3 hrs
or		
MATH 205	Statistical Methods	4 hrs
or		
PSYC 209	Measurement and Statistics	3 hrs

b. Concentrations and Individualized Study

In addition to completing the required core, students will develop, with the aid of a faculty advisor, a concentration program individualized to their interests. Some students might wish to pursue the linguistic focus of speech science or linguistics; others may wish to study natural language processing and artificial intelligence and have course work in computer science etc.

The faculty advisor must be among the faculty listed in Section V of this proposal. Upon approval of the major, an up-to-date list will be maintained on the Department website.   Further, the concentration program must be proposed by the student, approved by the student's faculty advisor and approved by the Undergraduate Studies Committee of the Department. All concentration programs will have at least 18 credits drawn from a list of eligible courses which will be maintained on the Department's website. The credits needed for some concentrations (e.g. Speech/Language Pathology) will exceed 18 hours because additional courses are needed to prepare students for graduate work in these specialized areas. The list of eligible courses will be updated and posted annually on the Departmental website. Substitute courses may be proposed by the student with the approval of the faculty advisor. The following list of courses is presently available in the 2006-2007 academic year or the courses have been proposed for the 2007-2008 academic year:

ANTH 102	Introduction to Biological Anthropology	3 hrs
ANTH 202	Human Evolution and the Fossil Record	3 hrs
ANTH 205	Anthropology and Human Nature	3 hrs
ANTH 300	Primatology	3 hrs
BISC 107	Elementary Evolutionary Ecology	3 hrs
BISC 195	Biological Evolution	3 hrs
CGSC 327	Race,Gender and Science (existing PHIL course submitted for cross listing with CGSC))	3 hrs
CGSC 330	Philosophy of Mind	3 hrs
CGSC 340	Cognition	3 hrs
CGSC 404	Animal Minds (new course submitted for approval)	3 hrs
CGSC 421	Philosophy, Biology, Society (new course submitted for approval) 3 hrs
CGSC 450	Recent Topics in Philosophy of Mind	3 hrs
CGSC 379	Audiology (new course subject to approval)	3 hrs
CGSC 481	Artificial Intelligence	3 hrs
CGSC496	Psycholinguistics	3 hrs
CISC 220	Data Structures	3 hrs
CISC 280	Program Development Techniques	3 hrs
CISC 304	Logic and Programming	3 hrs
CISC 409	Topics in Artificial Intelligence	3 hrs
LING 102	Language, Mind and Society	3 hrs
LING 203	Languages of the World	3 hrs
LING 222	Language and Gender	3 hrs
LING 253	Laboratory Phonetics	3 hrs
LING 265	Studies in Language	3 hrs
LING 376	Introduction to Communication Disorders	3 hrs
LING 377	Clinical Principles and Procedures in Speech Pathology	3 hrs
LING 378	Anatomy and Physiology of Speaking	3 hrs
LING 383	Language, Power and the Law	3 hrs
LING 385	Language and Law: Court Interpretation	3 hrs
LING 390	English Linguistics	3 hrs
LING 401	Historical Linguistics	3 hrs
LING 407	Phonology I	3 hrs
LING 409	Syntax I	3 hrs

LING 417	Language Planning	3 hrs
LING 433	Introduction to Acoustic Phonetics	3 hrs
LING 462	Language Acquisition	3 hrs
LING 476	Second Language Acquisition and Bilingualism	3 hrs
LING 477	The Structure of English	3 hrs
LING 480	Introduction to Sociolinguistics	3 hrs
LING 491	Semantics I	3 hrs
LING 610	Syntax II	3 hrs
MATH 205	Statistical Methods	4 hrs
MATH 210	Discrete Mathematics I	3 hrs
MATH 315	Discrete Mathematics II	3 hrs
PHIL 306	Philosophy of Science	3 hrs
PHIL 320	Theory of Knowledge	3 hrs
PHIL 330	Philosophy of the Mind	3 hrs
PHIL 421	Philosophy, Biology, Society (new course submitted for approval) 3 hrs
PHIL 450	Recent Topics in Philosophy of Mind	3 hrs
PSYC 207	Research Methods	3 hrs
PSYC 209	Measurement and Statistics	3 hrs
PSYC 310	Sensation and Perception	3 hrs
PSYC 316	Biological Basis of Behavior	3 hrs
PSYC 320	Introduction to Neuroscience	3 hrs
PSYC 344	Psychology of Language	3 hrs
PSYC 350	Developmental Psychology	3 hrs
PSYC 380	Psychopathology	3 hrs
PSYC 390	Social Psychology	3 hrs
PSYC 411	Ideas in Biopsychology	3 hrs
PSYC 442	Perception, Memory and Imagination	3 hrs

The concentrations will provide individualized learning experiences which are currently either unattainable at Delaware or obtained only in an ad hoc manner through such programs as the BALS or Dean's Scholar.

c. First Year Experience and Discovery Learning

All first-year students in the Cognitive Science Interest major must complete a first year experience (FYE). The Department is in the process of developing an FYE tailored to students interested in Cognitive Science.

All students are required top participate in a discovery or experiential learning program. As in the case of FYE, the Department is in the process of determining which discovery experiences would be of particular value for students in Cognitive Science. The Department currently offers opportunities for study abroad and internship possibilities which could meet this requirement.

d. Capstone Course

Senior majors will be brought together for a seminar on topics in cognitive science: CGSC 485 Seminar in Cognitive Science. This course may be team taught by a rotating group of faculty and will center around the application of the field's

divergent methodologies to solving problems in the study of mind. The course will require participants to engage in a research project that demonstrates grasp of the issues in the field as a whole and in their chosen focus. The research reported on may be collaborative research with a member of the faculty of the program or research conducted in a laboratory directed by a member of the cognitive science faculty. This work may lead to an Honors Thesis for qualified students.

3. Curriculum Enhancements

   Because the faculty associated with the major come from a range of fields, we envision that this program will provide a number of unusual opportunities for students in terms of out of classroom educational experiences. Students studying language development might get involved in ongoing research projects at the University either from an experimental vantage or from a more theoretical perspective investigating linguistic or computational issues. We also expect students in some tracks of the major to be able to find summer internships in local speech and hearing clinics, enroll in the various summer institutes in cognitive science and its contributing disciplines, such as the summer institutes of the Linguistic Society of America, the Cognitive Science Institute, and the various workshops on processing and modeling at the Association for Computational Linguistics.
   There are few programs in existence which permit students to engage in such exciting interdisciplinary study. We have no doubt that students coming out of this program will have the potential to go on to the very best graduate programs in the disciplines of cognitive science, linguistics, speech pathology and audiology, or work in emerging industrial fields such as speech technology, the development of human-computer interfaces (aka human factors), and other aspects of cognitive engineering.

4. Sample Student Program

The following is a typical sequence of coursework taken by a student majoring in Cognitive Science with a concentration in language development. It illustrates how such a student would meet requirements for the degree.

Year 1   Fall: CGSC 270, LING 101, CISC 105, PSYC 100 plus A&S/University requirement
          Spring: PHL 209, BISC 104, PSYC 100 plus A&S/University requirement

Year 2:   Fall: CGSC 314, LING 480 plus A&S/University requirements/electives
          Spring: LING 376, CGSC 340, plus A&S/University requirements/electives

Year 3:   Fall: LING 462 , LING 407, plus A&S/University requirements/electives
          Spring: CGSC 496, plus A&S/University requirements/electives

Summer between yrs 3&4: internship in language development lab

Year 4:   Fall: LING 409, plus electives
               Spring: CGSC 485 (Seminar), plus electives

5. University and College requirements

As is usual in the case of B.S. degrees in the College of Arts and Science, the University and College requirements are adapted to the needs of the curriculum.

a. University Requirements
    In order to receive the degree of B.S. in Cognitive Science all students must meet the University requirements for a bachelor's degree as specified in the University Catalog:

- ➢ A scholastic average of C (GPA of 2.0) in all work taken at the University.
- ➢ Completion of either 90 of the first 100 credits or 30 of the last 36 credits, full- or part-time, at the University of Delaware.
- ➢ One incoming semester of First Year Experience (FYE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. The number of credits will depend on the designated FYE (see FYE website: www.ugs.udel.edu/FYE).
- ➢ One semester of Freshman English (ENGL 110), completed with a minimum grade of C-.
- ➢ Three credits of Discovery Learning Experience (DLE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. DLE includes experiences such as internship, service learning, independent study, undergraduate research, and study abroad which are designated DLE (see DLE website: www.ugs.udel.edu/DLE).
- ➢ Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender related content. The purpose of the multicultural requirement is to provide students with some awareness of and sensitivity to cultural pluralism–an increasing necessity for educated persons in a diverse world. This requirement may be fulfilled through a course or courses taken to complete other course requirements, but cannot be fulfilled with any course taken on a pass/fail basis. Only course sections that are designated as multicultural in the registration booklet for a specific semester can be used to fulfill this requirement.
- ➢

b. College Skills Requirements
In order to receive the degree students must meet the following skill requirements of the College of Arts and Science:
Second Writing Requirement: . . . . 3 credits
A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended

faculty critique of both composition and content. This course must be taken after completion of 60 credit hours. Appropriate writing courses are designated in the semester's Registration Booklet. (See list of courses approved for second writing requirement.)

Mathematics: . . . . 0-4 credits
(one of the following three options
OPTION ONE:
MATH 114 College Mathematics and Statistics
(designed for students who do not intend to continue the study of mathematics)
MATH 115 Pre-Calculus
(designed for students who intend to continue the study of mathematics)
OPTION TWO:
Successful completion of any mathematics course at or above the 200-level except MATH 201, MATH 202, MATH 205, MATH 250, MATH 251, MATH 252, MATH 253, MATH 266, MATH 300 or MATH 450.
OPTION THREE:
Successful performance on a proficiency test in mathematics administered by the Department of Mathematical Sciences. (0 credits awarded)
The math requirement must be completed by the time a student has earned 60 credits. Students who transfer into the College of Arts and Sciences with 45 credits
or more must complete this requirement within two semesters.

Foreign Language: . . . . 0-12 credits
Completion of the intermediate-level course (107 or 112 or 214) in an ancient or modern language. The number of credits needed and initial placement will depend on the number of years of high school study of foreign language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination through the Foreign Languages and Literatures Department.

c. College Breadth Requirements

Group A *9*
Analysis and appreciation of the creative arts and humanities.
Nine credits of courses representing at least two departments or appropriate instructional units.
Group B *9*
The study of culture and institutions over time.
Nine credits of courses representing at least two departments or appropriate instructional units.
Group C. *9*
Empirically based study of human beings and their environment.
Nine credits of courses representing at least two departments or appropriate instructional units.
Group D *9*
The study of natural phenomena through experiment or analysis.

Nine credits of courses representing at least two departments or appropriate instructional units and including a minimum of one course with an associated laboratory.

If the grade earned is sufficient, a course may be applied toward more than one requirement (e.g., breadth and major requirements), but the credits are counted only once toward the total credits for graduation. If all but one course in a group has been taken in one department or program, a course cross-listed with that program will not satisfy the distribution requirement.

It should be noted that, as is usual for B.S. degrees, the number of credits required for College breadth requirements is reduced in comparison with B.A. degrees. This is due to the fact that the requirements for the major exceed those usual for a B.A.

6. Requirements for Honors B.S. in Cognitive Science
The recipient must complete:
1. All requirements for the Bachelor of Science degree in Cognitive Science:
    --A cumulative GPA of at least 3.400 at the time of
       graduation
    --At least 30 credits earned in Honors courses:
   --At least 12 credits in the major department or in
     courses in collateral disciplines specifically required
     for the major;
   --At least 12 credits in 300-level courses or higher, not
     including the first-year interdisciplinary Honors
     colloquium;
      --Three credits in an Honors Degree seminar or Honors capstone course or
    comparable senior experience approved by the major and the Honors
    Program, to be completed in one of the last two semester of the student's
    degree program.

2. All of the University's generic requirements for the Honors Baccalaureate degree.

3. The student's grade point average for courses in the major must be at least 3.50 at the time of graduation.

7. Plans to Offer at Least 9-12 Honors Credits on a Regular Basis
The following core courses in the program have in recent years been offered with Honors sections on at least an annual basis. In the case of CGSC and LING courses, the department plans to offer these courses as Honors courses at least once a year as specified below. The major is highly individualized, so we cannot guarantee that courses offered by other departments will include honors sections, but for courses offered under the CGSC and LING rubric, the opportunity will be made available to students to take the course on an Honors basis (course to include Honors enrichment component for Honors students):

LING 101 (separate Honors section frequently offered)
CGSC 270 (separate Honors section frequently offered)

CGSC 485 (probably as individual Honors section)
CISC 105 (separate Honors section frequently offered)
PHIL 330 (separate Honors section frequently offered)
PSYC 100 (separate Honors section frequently offered)

8. Honors Capstone Course
The Department plans to submit CGSC 485, the senior seminar required by the major, for approval as an Honors capstone course.

9. Combined B.S. and M.A. Option
Qualified undergraduate students in the in the B.S. in Cognitive Science as well as students completing a Bachelors degree in related fields like Anthropology, Computer and Information Science, Philosophy and Psychology (and other fields by application) may apply for the Combined B.S. and M.A. option, which combines the requirements of the undergraduate and master's degree programs in Cognitive Science and Cognitive Science and Linguistics. Whereas the traditional programs for the B.S. and M.A. degrees in Cognitive Science, and Linguistics and Cognitive Science involve 4 years of undergraduate work and 2 years of graduate work, the Combined B.S. and M.A. option enables students to earn both degrees in a 5-year period. Students who complete the Combined B.S. and M.A. program will graduate with both a Bachelor of Science degree in Cognitive Science and a Master of Arts degree in Linguistics and Cognitive Science. Students who are candidates for the Combined B.S. and M.A. option, and who complete the requirements for the B.S. but fail to complete the additional M.A. requirements, will receive the B.S. degree.

a. Admission into the Combined B.S. and M.A. Program
Students may apply for admission to the Combined B.S. and M.A. program at the end of the sophomore year. The application process requires submission of a completed graduate application form for review by the Departmental Graduate Studies Committee. Initial admission will be based upon the student's ability to meet the following recommended entrance criteria:
- Combined mathematics and verbal SAT scores of at least 1200
- An undergraduate GPA of at least 3.25
- Completion of all core courses for the B.S. other than CGSC 485
- Submission of an in-person writing sample, based on work completed in a Cognitive Science course

Admission is competitive so meeting the minimal requirements for admission does not guarantee admission nor does the failure to meet a requirement result in an automatic rejection. The GRE is not required for admission to the Combined B.S. and M.A. program by UD undergraduates.

b. Maintaining Status within the Program
Upon admission into the program and prior to the start of the junior year of study, the student will meet with his graduate advisor and submit a planned program of study, including all elective courses, to the Graduate Studies Committee. Planned programs of study are due by the end of fall semester of the student's junior year.

Continuation in the Combined B.S. and M.A. program is contingent upon maintaining a cumulative GPA of at least 3.25 in undergraduate courses with CGSC and LING designations and in graduate coursework. Satisfactory progress includes following the prescribed program of study.

Each student's progress and GPA will be evaluated at the end of each academic year by the student's advisor and the Graduate Studies Committee. Students who fail to meet the minimum GPA requirements or fail to show progress toward the degree will be dropped from the Combined B.S. and M.A. program. They may, however, continue in the undergraduate major unless their undergraduate progress is unsatisfactory according to the rules in effect for the B.S. program.

c. Degree Requirements for the Master of Arts in Linguistics and Cognitive Science and the B.S. in Cognitive Science

The graduate level course requirements for students in the Combined B.S. and M.A. option are the same as those for the M.A. in Linguistics and Cognitive Science. The course requirements for the degree include 30 credit hours planned in consultation with the student's advisor and the Director of Graduate Studies, which must include at least 21 credit hours in the Linguistics Department and at least one 800-level seminar. The M.A. in Linguistics and Cognitive Science is a flexible program of study that provides training in both Linguistics and Cognitive Science. Separate tracks are provided for students whose emphasis is clearly in Cognitive Science or in Linguistics. In addition, students may propose a program of study that combines elements of the Linguistics and Cognitive Science tracks. See the Department's Graduate Policy Statement for additional information. Students in the Combined B.S. and M.A. option must fulfill all graduate and undergraduate course requirements for both the M.A. and their undergraduate degree.

d. Course Overlap
In the event that a student in the Combined B.S. and M.A. option completes a required graduate course as an undergraduate, and elects to count that course toward the bachelors degree, he will be permitted to substitute another graduate course, the choice requiring approval of the Director of Graduate Studies. When a student completes a 400-level undergraduate course that has content very similar to that of a parallel 600-level graduate course, he may petition the Director of Graduate Studies to substitute another graduate course for the 600-level course in question.

e. Distribution of Credits in Combined B.S. and M.A. Program
The following table illustrates a typical distribution of graduate and undergraduate credits for a student in the Combined B.S. and M.A. program. This sample program is based on the assumption that the policy of the University is not to permit any reduction in undergraduate courses for students in the Combined B.S. and M.A. option. Thus, students in the program complete both

the full 124 credit hours of the B.S. and the full thirty credit hours of the M.A. It should be noted that, unless the student takes the maximal possible course load of 17 credit hours during several semesters, it may necessary for the student to participate in as many as two special sessions in order to complete the program in five calendar years.

In the sample program below, the student participates in one winter session consisting of two three credit courses and one summer session (an internship). For example, the Department of Linguistics conducts a summer and a winter session course in Italy each year that would be appropriate for many of the students. Summer session would also be an appropriate time for an internship relevant to the student's academic interests, as in the example below.

	UG Credits	Grad Credits
Freshmen Year		
Fall	16	0
Winter	0	0
Spring	15	0
Summer	0	0
Sophmore Year		
Fall	16	0
Winter	6	0
Spring	15	0
Summer	0	0
Junior Year		
Fall	16	0
Winter	0	0
Spring	12	3
Summer	4 [e.g. internship]	0
Senior Year		
Fall	12	3
Winter	0	0
Spring	12	3
Year 5		
Fall		9
Spring		12

2. Revisions to Planned Program of Study in Combined B.S. and M.A. Option
Students who wish to make changes to their program of study must first obtain permission from their advisor. The advisor must then make a written request to the Graduate Studies Committee to revise the program of study.

V. Resources Available

1. Learning Resources

Cognitive Science has been an area of research for University faculty for at least the last 15 years. Library holdings are already excellent and are improving

steadily. The Department of Linguistics has been ordering audio-visual materials in support of cognitive science as well. We do not envisage that that this degree will require an increase in the availability of learning resources.

2. Faculty / Administrative Resources

a. Administration
   The degree will be housed in the Department of Linguistics and Cognitive Science. In a separate document, the Department of Linguistics has proposed a change in the name of the Department from Department of Linguistics to Department of Linguistics and Cognitive Science.
b. Faculty
   As was mentioned previously, the Department of Linguistics is expanding to become the Department of Linguistics and Cognitive Science. Thus, it is appropriate to list both the core faculty of the Department and the membership of the program in Cognitive Science:
i. Core Faculty of the Department of Linguistics
Adams, Frederick R, Professor and Chair
Andreasen, Robin O, Associate Professor
Bruening, Benjamin T, Assistant Professor and Director of Graduate Studies
Cole, Peter, Professor and Director of Undergraduate Studies
Hermon, Gabriella, Professor
Hurewitz, Felicia Dawn, Assistant Professor
Poliquin, Gabriel Christopher, Assistant Professor
Schweda-Nicholson, Nancy, Professor
Tomioka, Satoshi, Associate Professor
Vogel, Irene Barrie, Professor
*The department is currently searching to fill two positions: one in phonology/phonetics, one in computational linguistics or psycholinguistics

ii. Faculty with Secondary Appointments in Linguistics
Arena, Louis Anthony, Professor Emeritus
Bunnell, H Timothy, Research Associate Professor
Sandra Carberry, Professor
Chester, Daniel Leon, Associate Professor
Golinkoff, Roberta, H. Rodney Sharp Professor
Idsardi, William J, Adjunct Professor
McCoy, Kathleen F, Professor
Mineo, Beth A, Associate Professor
Papafragou, Anna, Assistant Professor
Vijay K. Shanker, Associate Professor
Tadmor, Uri, Adjunct Assoc Professor

iii. Faculty in Cognitive Science
Ackerman, Brian, Psychology, Professor
Case, John, Computer and Information Sciences, Professor
Ferretti, Ralph, Education, Professor
Ginsburg-Block, Marika, Education, Assistant Professor
Hiebert, James, Education, Robert J. Barkley Professor

Hoffman, James, Psychology, Professor
Intraub, Helene, Psychology, Professor
Jordan, Nancy, Education, Professor
Kambhamettu, Chandra, Computer and Information Sciences, Associate Professor
Lavigne, Nancy, Education, Assistant Professor
Lehrman, Alexander, Foreign Language and Literature, Associate Professor
MacArthur, Charles, Education, Professor
McLaughlin, John P, Psychology, Associate Professor
Mosberg, Ludwig, Education, Professor Emeritus
Steve Most, Psychology, Assistant Professor
Mouza, Chrystalla, Education, Assistant Professor
Murray, Frank, Education, H. Rodney Sharp Professor
Northmore, David, Psychology, Professor
Pemberton, Elizabeth, Education, Assistant Professor
Pust, Joel, Philosophy, Associate Professor
Quinn, Paul, Psychology, Professor
Rasmussen, Christopher, Computer and Information Sciences, Assistant Professor
Rocek, Tom, Anthropology, Associate Professor
Rosenberg, Karen, Anthropology, Associate Professor and Chair
Satinoff, Evelyn, Psychology, Professor
Stanton, Mark, Psychology, Associate Professor
Walpole, Sharon, Education, Assistant Professor

VI. Resources Required

1. Learning Resources
The University currently has excellent learning resources (e.g. library holdings) for the major.
2. Personnel Resources
As an interdisciplinary program, Cognitive Science relies on courses contributed by the membership of the program as well as courses taught by faculty budgeted to the unit (i.e. those budgeted to the current Department of Linguistics, future Department of Linguistics and Cognitive Science). It is important to note that the core courses in the major are courses that are already offered on a regular basis. Thus, required courses will be available regularly. The only core course that has not been offered on a regular basis is CGSC 485, the senior seminar. This course will be offered annually as soon students reach senior status. The current faculty (including currently authorized new hires) is sufficient for these purposes.

While additional faculty are not essential for the major, the Department has been authorized to make the previously mentioned two new hires and further hires in subsequent years. These hires will further enrich the program.

3. Budgetary Needs
While additional funds above those already committed to the Department would enrich the major and help to produce a premiere program, current funding is sufficient for the introduction of the major.

VII. Implementation and Evaluation

1. Implementation Plan
The implementation will consist of design of the major (06F), departmental approval (06F), college and university senate committee approvals (06F/07S), Provost, President, and BOT approvals (07S), creation or cross-listing of relevant courses (06F), co-ordination of program offerings of participating departments in the cognitive sciences (06F/07S), preparation of materials for use in admissions and publicity (07S), enrollment of new students into the major (07F).

2. Assessment Plan
A committee has been appointed to come up with an assessment plan for the Cognitive Science Major. The committee includes Robin Andreasen (chair) and Benjamin Bruening. The committee members will draft a plan that specifies at least three clear, concise, and measurable learning goals as well as the course(s) that ensure that our students have the opportunity to achieve these goals. The plan will also propose a method of measurement to assess whether the desired outcomes are being achieved as well as ways in which the Department of Linguistics and Cognitive Science can use the results for improving instruction and strengthen the major. The committee will consult with the Department as well as the Office of Educational Assessment in the development of this plan. We hope to have the plan completed by the end of Spring semester 2007.

VIII. APPENDICES

Letters of Approval from Contributing Departments