BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN COGNITIVE SCIENCES

Program Learning Outcomes for the BA Degree with a Major in Cognitive Sciences

Upon completing the BA degree with a major in Cognitive Sciences, students will be able to:

1. Understand cognitive science as an interdisciplinary field and demonstrate the ability to synthesize key knowledge, theories, methods, research, and other elements from many related disciplines and bring these interdisciplinary elements to bear on problems or questions in the cognitive sciences.
2. Demonstrate a breadth of knowledge of the key issues, questions, and perspectives at stake in the multiple disciplines that contribute to the study of the cognitive sciences.
3. Achieve a depth of knowledge in one core area of the cognitive sciences – linguistics, neuroscience, philosophy, or psychology – and develop a knowledge base in that discipline, as well as an understanding of the theories, methods, and research approaches in that discipline.
4. Demonstrate the advanced critical thinking skills necessary to evaluate multiple theories or methods from a variety of related disciplines and choose which to apply to a particular problem or question in the cognitive sciences, as well as the advanced critical thinking ability necessary to evaluate the validity of research results that purport to address the same problem or question, but with different results.
5. Demonstrate the ability to communicate original research or research by other scholars effectively and at a college level in written and oral formats.

Requirements for the BA Degree with a Major in Cognitive Sciences

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BA degree with a major in Cognitive Sciences must complete:

- A minimum of 15 courses (45-49 credit hours, depending on course selection) to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 6 courses (18 credit hours) taken at the 300-level or above.
- A maximum of 4 courses (12 credit hours) from study abroad or transfer credit. For additional program guidelines regarding transfer credit, see the Policies (p. 5) tab.
- The requirements for one area of specialization (see below for areas of specialization). When students declare the major (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/#text) in Cognitive Sciences, students must additionally identify and declare one of five areas of specialization, either in:
  - Computation (p. 3), ***or***
  - Linguistics (p. 3), ***or***
  - Neuroscience (p. 4), ***or***
  - Philosophy (p. 4), ***or***
  - Psychology (p. 4).
- A minimum major GPA of 2.00 or higher in all coursework that satisfies requirements for the major.

Because of the common core requirements, it is possible for students to change their area of specialization at any time, even after initially declaring the major. To do so, please contact the Office of the Registrar (registrar@rice.edu).

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor or, where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Cognitive Sciences		45-49
Total Credit Hours Required for the BA Degree with a Major in Cognitive Sciences		120

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Cognitive Science Methods Core Course		
CSCI 340	METHODS OF COGNITIVE SCIENCE	3
Computer Science Core Course		
Select 1 course from the following:		*3-4*
CMOR 220	INTRODUCTION TO ENGINEERING COMPUTATION	
COMP 140	COMPUTATIONAL THINKING	
COMP 160	INTRODUCTION TO GAME PROGRAMMING IN PYTHON	
DSCI 101	INTRODUCTION TO DATA SCIENCE	
PSYC 342	COMPUTER APPLICATIONS IN PSYCHOLOGY	
Advanced Computing Core Course		
Select 1 course from the following:		*3-4*
CMOR 415 / ELEC 488 / NEUR 415	THEORETICAL NEUROSCIENCE: FROM CELLS TO LEARNING SYSTEMS	
COMP 182	ALGORITHMIC THINKING	
COMP 341	PRACTICAL MACHINE LEARNING FOR REAL WORLD APPLICATIONS	
DSCI 303	MACHINE LEARNING FOR DATA SCIENCE	

ELEC 378	MACHINE LEARNING: CONCEPTS AND TECHNIQUES	
ELEC 478	INTRODUCTION TO MACHINE LEARNING	
LING 430	COMPUTATIONAL LINGUISTICS	
NEUR 383 / BIOE 380 / ELEC 380	INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY	
PSYC 430	COMPUTATIONAL MODELING OF COGNITIVE PROCESSES	
STAT 413	INTRODUCTION TO STATISTICAL MACHINE LEARNING	
Linguistics Core Course		
Select 1 course from the following:		*3*
LING 200 / ANTH 200	INTRODUCTION TO THE SCIENTIFIC STUDY OF LANGUAGE	
LING 306	LANGUAGE, THOUGHT, AND MIND	
LING 315 / PSYC 315	INTRODUCTION TO SEMANTICS	
LING 393	STRUCTURE OF ENGLISH	
Neuroscience Core Course		
Select 1 course from the following:		*3*
BIOS 385	CELLULAR AND MOLECULAR MECHANISMS OF THE NEURON	
NEUR 362 / PSYC 362	COGNITIVE NEUROSCIENCE: EXPLORING THE LIVING BRAIN	
NEUR 380 / PSYC 380	FUNDAMENTAL NEUROSCIENCE SYSTEMS	
NEUR 411 / LING 411	LANGUAGE AND THE BRAIN	
NEUR 415 / CMOR 415 / ELEC 488	THEORETICAL NEUROSCIENCE: FROM CELLS TO LEARNING SYSTEMS	
NEUR 416 / CMOR 416 / ELEC 489	NEURAL COMPUTATION	
Philosophy Core Course		
Select 1 course from the following:		*3*
PHIL 130	THE SCIENCES OF THE MIND	
PHIL 310	MATHEMATICAL LOGIC	
PHIL 318	PHILOSOPHY OF LANGUAGE	
PHIL 330	PHILOSOPHY OF MIND	
Psychology Core Course		
PSYC 203	INTRODUCTION TO COGNITIVE PSYCHOLOGY	3
Advanced Psychology Core Course		
Select 1 course from the following:		*3*
PSYC 308	MEMORY	
PSYC 309 / LING 309	PSYCHOLOGY OF LANGUAGE	
PSYC 311	VISUAL COGNITION	
PSYC 351	PSYCHOLOGY OF PERCEPTION	
PSYC 461	REASONING, DECISION MAKING, PROBLEM SOLVING	
PSYC 466	HUMAN ELECTROPHYSIOLOGY	
Statistics Core Course		
Select 1 course from the following:		*3-4*
PSYC 339	STATISTICAL METHODS-PSYCHOLOGY	
SOSC 302	QUANTITATIVE ANALYSIS FOR THE SOCIAL SCIENCES [1]	
STAT 280	ELEMENTARY APPLIED STATISTICS	
or STAT 180	AP/OTH CREDIT IN STATISTICS	
STAT 305	INTRODUCTION TO STATISTICS FOR BIOSCIENCES	
STAT 310 / ECON 307	PROBABILITY AND STATISTICS	
STAT 315 / DSCI 301	PROBABILITY AND STATISTICS FOR DATA SCIENCE	
Area of Specialization [2]		
Select 1 from the following Areas of Specialization (see Areas of Specialization below):		*9-13*
Computation		
Linguistics		
Neuroscience		
Philosophy		
Psychology		
Elective Requirements [3]		
Select 2-3 elective courses from the other Areas of Specialization or from the following additional approved electives:		*9-10*
CSCI 240	MINDS, BRAINS, AND COMPUTERS: FOUNDATIONS OF COGNITIVE SCIENCE	
CSCI 390	SUPERVISED RESEARCH IN COGNITIVE SCIENCES	
CSCI 481	HONORS PROJECT	
ECON 210	BEHAVIORAL ECONOMICS	
HIST 353	HISTORY OF SENSATION	
Total Credit Hours Required for the Major in Cognitive Sciences		**45-49**
Additional Credit Hours to Complete Degree Requirements *		40-44
University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) *		31
Total Credit Hours		**120**

Footnotes and Additional Information

* **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

1 SOSC 302 requires concurrent enrollment of one of the following lab courses: POLI 102 (political science), PSYC 102 (psychology), or SOCI 102 (sociology). Cognitive Sciences majors are advised to choose PSYC 102 as the concurrent lab course.

[2] Students must complete at least 3 courses (9 credit hours), and no more than 4 courses (12 credit hours) in one Area of Specialization. Students may not use the same course to fulfill both a Core Course requirement and an Area of Specialization requirement.

[3] If the Cognitive Sciences major chooses 3 courses (9 credit hours minimum) to satisfy the Area of Specialization requirement, they must complete a remainder total of 3 courses (9 credit hours minimum) to fulfill the Elective requirement. If the Cognitive Sciences major chooses 4 courses (12 credit hours minimum) to satisfy the Area of Specialization requirement, they must complete a remainder total of 2 courses (6 credit hours minimum) to fulfill the Elective requirement. The courses that are eligible to fulfill the Electives requirement are the same as the courses required to fulfill the Areas of Specialization outside the student's chosen Area of Specialization (listed below), with additional approved elective courses also available (listed above). However, courses used to fulfill the Elective Requirements must come from outside the student's chosen Area of Specialization. For example, if the student's Area of Specialization is Psychology, all Elective courses must come from areas other than Psychology.

Areas of Specialization

Students must complete the requirements as listed for one of the following areas of specialization as offered by the Cognitive Sciences major. A total of 6 courses (minimum of 18-19 credit hours, depending on course selection) must be taken in the area of specialization and elective requirements. See footnote[3] above.

Area of Specialization: Computation

To fulfill the remaining Cognitive Sciences major requirements, students pursuing the Computation area of specialization must complete:

- a minimum of 3 courses (9-12 credit hours, depending on course selection) from the Computation area of specialization
- 2 courses (6-7 credit hours, depending on course selection) from any area of specialization ***outside*** Computation (from Linguistics, Neuroscience, Philosophy, Psychology or from approved elective coursework (listed above))
- 1 course (3-4 credit hours, depending on course selection) from ***any*** area of specialization (including Computation) or from approved elective coursework (listed above)

Code	Title	Credit Hours
Select 9-12 credit hours from the following:		
BIOE 380 / ELEC 380 / NEUR 383	INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY	3
CMOR 415 / ELEC 488 / NEUR 415	THEORETICAL NEUROSCIENCE: FROM CELLS TO LEARNING SYSTEMS	3
CMOR 416 / ELEC 489 / NEUR 416	NEURAL COMPUTATION	3
COMP 182	ALGORITHMIC THINKING	4
COMP 330	TOOLS AND MODELS FOR DATA SCIENCE	3
COMP 341	PRACTICAL MACHINE LEARNING FOR REAL WORLD APPLICATIONS	3
COMP 440 / ELEC 440	ARTIFICIAL INTELLIGENCE	4
COMP 442	REINFORCEMENT LEARNING	3
COMP 447 / ELEC 447	INTRODUCTION TO COMPUTER VISION	3
COMP 450 / ELEC 450 / MECH 450	ALGORITHMIC AND AI-ENABLED ROBOTICS	4
COMP 498 / ELEC 498 / MECH 498	INTRODUCTION TO ROBOTICS	3
DSCI 101	INTRODUCTION TO DATA SCIENCE	3
DSCI 302	INTRODUCTION TO DATA SCIENCE TOOLS AND MODELS	3
DSCI 303	MACHINE LEARNING FOR DATA SCIENCE	3
ELEC 378	MACHINE LEARNING: CONCEPTS AND TECHNIQUES	3
ELEC 475	LEARNING FROM SENSOR DATA	3
ELEC 478	INTRODUCTION TO MACHINE LEARNING	3
ELEC 483	MACHINE LEARNING AND SIGNAL PROCESSING FOR NEURO ENGINEERING	3
PSYC 430	COMPUTATIONAL MODELING OF COGNITIVE PROCESSES	3
STAT 413	INTRODUCTION TO STATISTICAL MACHINE LEARNING	3

Area of Specialization: Linguistics

To fulfill the remaining Cognitive Sciences major requirements, students pursuing the Linguistics area of specialization must complete:

- a minimum of 3 courses (9 credit hours) from the Linguistics area of specialization
- 2 courses (6-7 credit hours, depending on course selection) from any area of specialization ***outside*** Linguistics (from Computation, Neuroscience, Philosophy, or Psychology, or from approved elective coursework (listed above))
- 1 course (3-4 credit hours, depending on course selection) from ***any*** area of specialization (including Linguistics) or from approved elective coursework (listed above)

Code	Title	Credit Hours
Select 9-12 credit hours from the following:		
LING 200 / ANTH 200	INTRODUCTION TO THE SCIENTIFIC STUDY OF LANGUAGE	3
LING 300	LINGUISTIC ANALYSIS	3
LING 301	PHONETICS	3
LING 306	LANGUAGE, THOUGHT, AND MIND	3
LING 309 / PSYC 309	PSYCHOLOGY OF LANGUAGE	3
LING 315 / PSYC 315	INTRODUCTION TO SEMANTICS	3
LING 320	ORIGINS AND EVOLUTION OF HUMAN LANGUAGE	3
LING 325 / PSYC 325	LANGUAGE ACQUISITION	3
LING 327	RESEARCH ON BRAILLE	3

LING 393	STRUCTURE OF ENGLISH	3
LING 397	SPEECH AND HEARING SCIENCE	3
LING 400	LINGUISTIC ANALYSIS II	3
LING 401	ANALYSIS OF SOUND PATTERNS	3
LING 409	SPECIAL TOPICS [1]	3
LING 411 / NEUR 411	LANGUAGE AND THE BRAIN	3
LING 419	MULTILINGUALISM	3
LING 430	COMPUTATIONAL LINGUISTICS	3

Footnotes and Additional Information

1 LING 409 only counts toward the Cognitive Sciences major when the topic is related to Cognitive Science. For questions regarding a specific instance of LING 409, consult a CSCI major advisor.

Area of Specialization: Neuroscience[1]

To fulfill the remaining Cognitive Sciences major requirements, students pursuing the Neuroscience area of specialization must complete:

- a minimum of 3 courses (9 credit hours) from the Neuroscience area of specialization
- 2 courses (6-7 credit hours, depending on course selection) from any area of specialization ***outside*** Neuroscience (from Computation, Linguistics, Philosophy, or Psychology, or from approved elective coursework (listed above))
- 1 course (3-4 credit hours, depending on course selection) from ***any*** area of specialization (including Neuroscience) or from approved elective coursework (listed above)

Code	Title	Credit Hours
Select 9-12 credit hours from the following:		
BIOS 385	CELLULAR AND MOLECULAR MECHANISMS OF THE NEURON	3
BIOS 442	MOLECULES, MEMORY AND MODEL ANIMALS: METHODS IN BEHAVIORAL NEUROSCIENCE	3
ELEC 435	NEURAL INTERFACE ENGINEERING LABORATORY	3
NEUR 362 / PSYC 362	COGNITIVE NEUROSCIENCE: EXPLORING THE LIVING BRAIN	3
NEUR 380 / PSYC 380	FUNDAMENTAL NEUROSCIENCE SYSTEMS	3
NEUR 383 / BIOE 380 / ELEC 380	INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY	3
NEUR 411 / LING 411	LANGUAGE AND THE BRAIN	3
NEUR 415 / CMOR 415 / ELEC 488	THEORETICAL NEUROSCIENCE: FROM CELLS TO LEARNING SYSTEMS	3
NEUR 416 / CMOR 416 / ELEC 489	NEURAL COMPUTATION	3
PSYC 311	VISUAL COGNITION	3
PSYC 366	METHODS IN SOCIAL COGNITIVE AND AFFECTIVE NEUROSCIENCE	3
PSYC 375	NEUROPSYCHOLOGY OF LANGUAGE AND MEMORY	3
PSYC 432	BRAIN AND BEHAVIOR	3
PSYC 487	FUNCTIONAL HUMAN NEUROANATOMY	3

Footnotes and Additional Information

1 Some of the neuroscience courses are taught by Baylor College of Medicine (BCM) faculty. Rice-BCM neuroscience course offerings change frequently. BCM courses not on the list above may be counted at the discretion of the steering committee. The most up-to-date listing of courses counting as additional courses is found at cogsci.rice.edu (http://cogsci.rice.edu).

Area of Specialization: Philosophy

To fulfill the remaining Cognitive Sciences major requirements, students pursuing the Philosophy area of specialization must complete:

- a minimum of 3 courses (9 credit hours) from the Philosophy area of specialization
- 2 courses (6-7 credit hours, depending on course selection) from any area of specialization ***outside*** Philosophy (from Computation, Linguistics, Neuroscience, or Psychology, or from approved elective coursework (listed above))
- 1 course (3-4 credit hours, depending on course selection) from ***any*** area of specialization (including Philosophy) or from approved elective coursework (listed above)

Code	Title	Credit Hours
Select 9-12 credit hours from the following:		
PHIL 130	THE SCIENCES OF THE MIND	3
PHIL 230	HUMAN MINDS	3
PHIL 231	ANIMAL MINDS	3
PHIL 310	MATHEMATICAL LOGIC	3
PHIL 318	PHILOSOPHY OF LANGUAGE	3
PHIL 330	PHILOSOPHY OF MIND	3
PHIL 345	THEORY OF KNOWLEDGE	3
PHIL 430	ADVANCED TOPICS IN PHILOSOPHY OF MIND	3
PHIL 431	ADVANCED TOPICS IN THE SCIENCES OF THE MIND	3

Area of Specialization: Psychology

To fulfill the remaining Cognitive Sciences major requirements, students pursuing the Psychology area of specialization must complete:

- a minimum of 3 courses (9-10 credit hours, depending on course selection) from the Psychology area of specialization
- 2 courses (6 credit hours) from any area of specialization ***outside*** Psychology (from Computation, Linguistics, Neuroscience, or Philosophy, or from approved elective coursework (listed above))
- 1 course (3-4 credit hours, depending on course selection) from ***any*** area of specialization (including Psychology) or from approved elective coursework (listed above)

Code	Title	Credit Hours
Select 9-13 credit hours from the following:		
PSYC 308	MEMORY	3
PSYC 309 / LING 309	PSYCHOLOGY OF LANGUAGE	3
PSYC 310	PSYCHOLOGY OF AGING	3

PSYC 311	VISUAL COGNITION	3
PSYC 321	DEVELOPMENTAL PSYCHOLOGY	3
PSYC 325 / LING 325	LANGUAGE ACQUISITION	3
PSYC 351	PSYCHOLOGY OF PERCEPTION	3
PSYC 362 / NEUR 362	COGNITIVE NEUROSCIENCE: EXPLORING THE LIVING BRAIN	3
PSYC 366	METHODS IN SOCIAL COGNITIVE AND AFFECTIVE NEUROSCIENCE	3
PSYC 370	INTRODUCTION TO HUMAN FACTORS AND ERGONOMICS	3
PSYC 375	NEUROPSYCHOLOGY OF LANGUAGE AND MEMORY	3
PSYC 380 / NEUR 380	FUNDAMENTAL NEUROSCIENCE SYSTEMS	3
PSYC 409	METHODS IN HUMAN-COMPUTER INTERACTION	3
PSYC 411	HISTORY OF PSYCHOLOGY	3
PSYC 430	COMPUTATIONAL MODELING OF COGNITIVE PROCESSES	3
PSYC 432	BRAIN AND BEHAVIOR	3
PSYC 441	HUMAN-COMPUTER INTERACTION	3
PSYC 461	REASONING, DECISION MAKING, PROBLEM SOLVING	3
PSYC 462	NON-TRADITIONAL INTERFACES	3
PSYC 463	MEDICAL HUMAN FACTORS	3
PSYC 464	USABILITY ASSESSMENT	3
PSYC 466	HUMAN ELECTROPHYSIOLOGY	3
PSYC 468	HUMAN FACTORS IN ARTIFICIAL INTELLIGENCE	3
PSYC 470	ENGINEERING PSYCHOLOGY	3
PSYC 480	ADVANCED TOPICS [1]	3
PSYC 487	FUNCTIONAL HUMAN NEUROANATOMY	3

Footnotes and Additional Information

[1] PSYC 480 only counts toward the Cognitive Sciences major when the topic is related to Cognitive Science. For questions regarding a specific instance of PSYC 480, consult a CSCI major advisor.

Policies for the BA Degree with a Major in Cognitive Sciences

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). The Office of Academic Advising maintains the university's official list of transfer credit advisors (https://oaa.rice.edu/advising-network/transfer-credit-advisors/) on their website: https://oaa.rice.edu. Students are encouraged to meet with the applicable transfer credit advisor as well as their academic program director when considering transfer credit possibilities.

Program Transfer Credit Guidelines

Students pursuing the major in Cognitive Sciences should be aware of the following program-specific transfer credit guideline:

- No more than 4 courses (12 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the major.

Additional Information

For additional information, please see the Cognitive Sciences website: https://cogsci.rice.edu/.

Opportunities for the BA Degree with a Major in Cognitive Sciences

Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (*summa cum laude*, *magna cum laude*, and *cum laude*) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Honors Program in Cognitive Sciences

Students with a 3.50 major GPA in Cognitive Sciences and 3.30 overall GPA may apply for the cognitive sciences honors program. Students in the honors program are expected to conduct an independent research project of either one or two semesters under the guidance of a member of the cognitive sciences faculty. Students who wish to enter this program should consult with prospective advisors during their junior year and submit a proposal by the end of the semester preceding the initiation of the project. Typically, this means submitting a proposal by the end of the junior year and beginning the project during the fall of the senior year. Proposal will be reviewed by both the supervisor and the program director. Students who undertake a two-semester project will be allowed to continue into the second semester only if their advisor judges that sufficient progress has been made during the first semester. At the end of a project, honors students are expected to submit a final paper to both their advisor and the program director and make an oral presentation to faculty and students. For more details, please contact the program director.

Independent Research

Majors may undertake supervised independent research by enrolling in CSCI 390 or the honors program. Students who wish to take CSCI 390 must complete a CSCI 390 contract and have it approved by their supervisor and the program director prior to the end of the first week of classes. All students taking CSCI 390 also must write a substantive research paper, which is to be submitted to both their advisor and the program director at the end of the semester, and presented in the Rice Undergraduate Research Symposium as a poster. (Copies of the contract form and instructions are available on the "forms" section of the cognitive sciences website.)

Additional Information

For additional information, please see the Cognitive Sciences website: https://cogsci.rice.edu/.