

September 2026

COGNITIVE & INFORMATION SCIENCE MAJOR

University of California, Riverside

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COGNITIVE AND INFORMATION SCIENCE NEW MAJOR PROPOSAL FOR SENATE REVIEW

Name of the academic program and the department or unit that will administer the program.

Name: Cognitive and Information Science (CGIS)
Department: Department of Philosophy
Unit: College of Humanities, Arts, and Social Science

A thorough justification, including the motivation for the creation of the program in terms of student interest and professional or academic importance.

Cognitive and Informational Science sits at the interface of several fields, from anthropology, artificial intelligence, biology, computer science, linguistics, mathematics, neuroscience, philosophy, psychology, and statistics. The central questions that unite the field concern the nature of cognition and action. These central questions branch off into questions concerning the structures of information, the nature of rationality and human behavior, and the connections between thought, perception, and feeling, the physical realization of these mental phenomena in brain and, if man-made entities like computers and robots can think, see, and feel, in hardware.

While Cognitive Science is still a new discipline, originating in the 1950s as a distinctive field, many universities currently have Cognitive Science majors or programs; in fact, UC Riverside is the only UC campus without one. In this way, UC Riverside is behind the times, lacking a home for students interested in the emerging field and its relations to new industries. While all the UC campuses (besides UC Riverside) have Cognitive Science majors, only UC Merced has a Cognitive and Information Science major.

There are many reasons for offering a Cognitive and Information Science undergraduate major at UCR:

- *Rapid Technological Change:* with the rise of Artificial Intelligence, Big Data, and the digital revolution, there is an increasing demand for individuals who understand the cognitive, informational, and technological aspects of these developments.
- *Interdisciplinary Learning:* Cognitive and Information Science promotes a holistic approach to the intersection of several disciplines.
- *Bridging the Gap between Technology, Social Scientific Inquiry, and Humanistic Understanding.* There is a growing need to bridge the gap between purely technical roles and those that require an understanding of human behavior. The major addresses that need.
- *Potential Careers:* Graduates could then pursue careers in a number of fields, including: graduate study in cognitive and information sciences; business and

management careers; data science careers; education careers; ontological engineering; health sciences, and many more.

Relationship of the new program to existing programs.

The closest existing programs are Computer Science and Engineering, Linguistics, Neuroscience, Philosophy, Psychology, and Neuroscience. Mathematics and Statistics are also relevant. Though there is overlap in all these majors with CGIS, the new major is distinct in many ways, but primarily because of its focus on the interdisciplinary study of cognition and information, with a focus on theoretical foundations.

The proposed curriculum. Great care should be given in this area, correct rubrics should be listed for courses, all cross listings should be listed, unit total considerations should be taken into account and totals should be verified by program staff, faculty, and appropriate Executive Committee personnel. A copy of the proposed program change should be provided for inclusion in the Catalog

Please see Appendices

Appendix A: Requirements for the new B.S. in Cognitive and Information Science

Appendix B: Catalog Copy for the new B.S. in Cognitive and Information Science

Appendix C: Two Sample Programs of Study

Appendix D: Course Descriptions

A list of faculty who will be involved in the program, including those teaching, advising, and administering.

Peter Graham, Director (Philosophy)

Khaleel Abdulrazak (Psychology)

Vrinda Chidambaram (Comparative Literature and Languages: Linguistics)

Neftali Watkinson Medina (Computer Science and Engineering)

Michael Nelson (Philosophy)

Erich Reck (Philosophy)

Eric Schwitzgebel (Philosophy)

Heidi Waltz (Comparative Literature and Languages: Linguistics)

Weiwei Zhang (Psychology)

For interdisciplinary programs, the degree of participation and the role of each department must be explicitly described. The chairs of all participating departments must provide written approval for the creation of the program and indicate their commitment to provide necessary resources including faculty release.

Please see Appendix E

Projected enrollment in the program

150-300

Name of degree, if applicable, and the anticipated number of degrees to be granted when the program reaches steady state.

B.S. in Cognitive and Information Science 75 degrees per year

Potential impact of the new program on existing programs. If the proposed program includes required courses from a department other than the administering department, the proposal must include a statement from the department indicating that it has been consulted and that it will provide access to the required courses.

- **Linguistics**: though there are no specific courses in Linguistics required to complete the major, the new major would most likely increase enrollment in Linguistics courses, LING 020 and 021 to fulfill lower-division optional requirements. Some students will take LING 121, LING 151 and/or LING 162 to fulfill (part of) their four-course upper-division electives requirement. Projected impact: minimal to moderate.
- **Mathematics**: a few students from the new major would take some upper-division courses to fulfill (part of) their four-course upper-division electives requirement. Projected impact: minimal to moderate.
- **Computer Science and Engineering**: the new major may impact a few lower-division and upper-division courses in Computer Science and Engineering. Students majoring in CGIS would fulfill their Programming requirement through CS 009A or CS 042, courses for non-engineering and nonscience majors. Some CGIS students would also pursue additional lower-division courses (CS 009B, 009C, 010C) as pre-requisites for some upper-division CS courses (CS 105, CS 100, CS 111, CS 141) to fulfill (part of) their four-course upper-division electives requirement. Projected impact: significant.
- **Philosophy**: the new major would increase demand on logic courses in Philosophy (PHIL 008, PHIL 124, PHIL 125, PHIL 126), on other lower-division courses, and on several upper-division courses, especially the new core upper-division courses cross listed with CGIS. Students may then choose to take further upper-division Philosophy courses to fulfill (part of) their four-course upper-division electives requirement. Projected impact: significant.
- **Psychology**: though there are no specific courses in Psychology required for the new major, PSYC 001 and PSYC 110 both count towards optional requirements. Students may then opt to take upper-division Psychology courses to fulfill (part of) their four-course upper-division electives requirement. To take upper-division Psychology courses, students would have to complete various pre-requisites.
 - One route would be to take PSYC 001 and PSYC 110 as pre-requisites for PSYC 122, PSYC 122L, PSYC 126, and PSYC 128.
 - Another route would include BIO 005A, BIO 005B, CHEM 001A, CHEM 001B, CHEM 001C, and CBNS 106 as pre-requisites for PSYC 120, PSYC 121, PSYC 122, PSYC 123, PSYC 124, PSYC 125, PSYC 126, and PSYC 127.

- A third route would include PSYC 001, PSYC 002, PSYC 011, and PSYC 012 as prerequisites to cognition courses in the PSYC 130 series and PSYC 163.

The most likely impact would be students taking PSYC 001 and PSYC 110 to fulfill optional requirements. Those students would then be qualified for PSYC 122, PSYC 122L, and PSYC 128. Some of those would take those courses to fulfill their upper-division electives requirement. Projected impact: significant.

- Statistics: a few students in the new major will take STAT 004 or STAT 010 for lower-division, and an even smaller number would take STAT 156A, 156B or 160A to fulfill (part of) their four-course upper-division electives requirement. Projected impact: minimal to moderate.

A full listing of resources required for start-up and for operations. In cases where no additional resources will be needed, this must be explicitly stated. This listing may include: personnel (faculty FTE or temporary positions, Teaching Assistants or Readers, administrative staff, technical support); support services including computer facilities and library resources; space requirements. A plan indicating how the resources will be obtained would also be helpful to the committee in reviewing the proposal. A letter of support from the College Dean and/or Executive Vice Chancellor-Provost indicating endorsement as well as a promise of support for the proposal also would be extremely helpful.

- Faculty FTE: assuming a significant number of majors, the program will require 2.0 FTE to supplement existing FTE to cover existing and new courses for the program.
- Teaching Assistants: the program will require teaching assistants for lower-division courses with discussion sections.
- Administrative Staff: the program will be administered by existing staff in CHASS, especially staff assigned to Philosophy.
- Computer facilities and library resources: no new facilities required
- Space requirements: no new space requirements.

Both internal and external letters of support should be provided with the proposal. Internal letters of support are often from UCR department chairs and faculty of related programs. The external letters should be from other UC campuses or other peer institutions. Letters from off-campus help to establish the quality of the program and its fit within the context of related programs at other universities. Upon consultation with the CEP the demand for external letters may be waived.

Please see Appendix F

Approvals from program faculty, College faculty (if the new proposal affects a college regulation), and the appropriate Executive Committee should be obtained before forwarding the new program to the attention of the Senate Analyst for CEP.

Department of Philosophy, November 1, 2025
CHASS Executive Committee, May 27, 2026

Appendix A: Requirements for the new B.S. in Cognitive and Information Science Undergraduate Degree

Lower Division (16 units)

CGIS 001 – Introduction to Cognitive and Information Science (4 units)

Logic: One course from the following (4 units)

CS 011 / MATH 011– Introduction to Discrete Structures

Prerequisite(s): MATH 007A or MATH 009A or MATH 09HA; CS 010A or MATH 007B or MATH 009B or MATH 09HB.

PHIL 008 (or PHIL 008H) – Introduction to Logic

Programming: One course from the following (4 units)

CS 009A– Data Oriented Introduction to Computing I

Prerequisite(s): MATH 004, may be taken concurrently or MATH 005A, may be taken concurrently or MATH 006B, may be taken concurrently or MATH 007A, may be taken concurrently or MATH 009A, may be taken concurrently or MATH 09HA, may be taken concurrently.

CS 042—A Hitchhiker’s Guide to Artificial Intelligence (4 units)

Prerequisite(s): None.

Interdisciplinary Foundations: One course from the following (4 units)

CS 009B – Data Oriented Introduction to Computing II

Prerequisite(s): CS 009A or equivalent.

LING 020 – Language and Linguistics

LING 021 – Grammar

PHIL 006 (or PHIL 006H) – Reason, Belief, and Truth

PHIL 007 (or PHIL 007H) – Critical Thinking

PHIL 010 (or PHIL 010H) – Language, Mind, and Reality

PSYC 001 – Introductory Psychology

PSYC 002 – Introductory Psychology

STAT 004 – Elements of Data Science

STAT 010 – Introduction to Statistics

Prerequisite(s): MATH 005A or MATH 006B or MATH 007A or MATH 009A or MATH 09HA.

Upper Division (36 units)

Upper Division Foundations (8 units)

CGIS 100 – Cognition, Computation, and Information

Prerequisite(s): CGIS 001; CS 009A or CS 042; CS 011 / MATH 011 or PHIL 008 or PHIL 008H

PHIL 124 – Formal Logic

Prerequisite(s): CS 011/ MATH 011 or CS 120A/EE 120A or CS 150 or PHIL 008 or PHIL 008H or consent of instructor.

Upper Division Core : Any three of the following seven courses (12 units)

CGIS 135 – Philosophy of Psychology

Prerequisite(s): one course in philosophy or consent of instructor. Cross-listed with PHIL 135.

CGIS 148 – Philosophy of Information

Prerequisite(s): CGIS 100 and PHIL 124. Cross-listed with PHIL 148.

CGIS 146 – Philosophy of Computer Science and Artificial Intelligence

Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering. Cross-listed with PHIL 146.

CGIS 175 – Perception and Cognition

Prerequisite(s): CGIS 001 or PSYC 001 or PHIL 006 or PHIL 010 or PHIL 010H. Cross-listed with PHIL 175.

PHIL 130 – Theory of Knowledge

Prerequisite(s): one course in philosophy or consent of the instructor.

PHIL 134 – Philosophy of Mind

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 170 – Ethics of Artificial Intelligence

Prerequisite(s): Upper division standing or consent of the instructor

PSYC 110 – Brain and Behavior

Prerequisite(s): PSYC 001 with a grade of “C-” or better, or equivalents, or consent of instructor.

Upper-Division Electives: Any four additional upper-division courses from the following (16 units)

Cognitive and Information Science

CGIS 135 – Philosophy of Psychology

Prerequisite(s): one course in philosophy or consent of instructor. Cross-listed with PHIL 135.

CGIS 148 – Philosophy of Information

Prerequisite(s): CGIS 100 and PHIL 124. Cross-listed with PHIL 148.

CGIS 146 – Philosophy of Computer Science and Artificial Intelligence

Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering. Cross-listed with PHIL 146.

CGIS 175 – Fundamentals of Perception and Cognition

Prerequisite(s): CGIS 001 or PSYC 001 or PHIL 006 or PHIL 010 or PHIL 010H. Cross-listed with PHIL 175.

Computer Science and Engineering

CS 100 – Software Construction

Prerequisite(s): CS 010C with a grade of C- or better.

CS 108 – Data Science Ethics

Prerequisite(s): CS 105 or STAT 107 or CS 171 / EE 142; or consent of instructor.

Cross-listed with STAT 108.

CS 100 – Software Construction

Prerequisite(s): CS 010C with a grade of C- or better.

CS 105 – Data Analysis Methods

Prerequisite(s): CS 009B with a grade of C- or better or CS 010B with a grade of C or better; restricted to class level standing of sophomore, junior, senior, or masters.

CS 111 – Discrete Structures

Prerequisite(s): CS 010A; CS 011 / MATH 011; MATH 009C or MATH 09HC; MATH 031 or EE 020B.

CS 120A / EE 120A – Logic Design

Prerequisite(s): CS 061 with a grade of C- or better.

CS 135 – Virtual Reality

Prerequisite(s): CS 100

CS 141 – Intermediate Data Structures and Algorithms

Prerequisite(s): CS 010C with a grade of C- or better; CS 111; MATH 009C or MATH 09HC; proficiency in C++.

CS 142 – Algorithm Engineering

Prerequisite(s): CS 100, CS 141, or equivalent.

CS 144 – Algorithms for Bioinformatics

Prerequisite(s): CS 141.

CS 145 – Combinatorial Optimization Algorithms

Prerequisite(s): CS 141; MATH 031 or MATH 131.

CS 150 – Automata and Formal Languages

Prerequisite(s): CS 010C with a grade of C- or better; CA 111; MATH 009C or MATH 009HC

CS 170 – Introduction to Artificial Intelligence

Prerequisite(s): CS 100 with a grade of “C-” or better; CS 111.

CS 172 – Introduction to Information Retrieval

Prerequisite(s): CS 100; CS 111; EE 114 or STAT 155.

CS 173 – Introduction to Natural Language Processing

Prerequisite(s): CS 100; CS 111; EE 114 or STAT 155.

Linguistics

LING 121 – Syntax

Prerequisite(s): LING 020.

LING 151 – Semantics

Prerequisite(s): LING 121.

LING 162 – Language and the Brain

Prerequisite(s): LING 020 or PSYC 110 or PSYC 135 or CBNS 106. Cross-listed with PSYC 128.

Mathematics

MATH 121 – Game Theory

Prerequisite(s): MATH 010A with a grade of “C-” or better.

MATH 144 – Introduction to Set Theory

Prerequisite(s): MATH 010A with a grade of “C-” or better.

MATH 149A – Probability and Mathematical Statistics

Prerequisite(s): MATH 010A with a grade of “C-” or better, MATH 010B with a “C-” or better, concurrent enrollment in or completion of MATH 046 with a grade of “C-” or better.

MATH 149B – Probability and Mathematical Statistics

Prerequisite(s): MATH 010A with a grade of “C-” or better, MATH 010B with a grade of “C-” or better, MATH 046 with a grade of “C-” or better, MATH 149A with a grade of “C-” or better.

Philosophy

PHIL 107 – Languages and Minds

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 114 – Science and Human Understanding

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 118 – Personhood and Personal Identity

Prerequisite(s): upper division standing or consent of instructor.

PHIL 125 – Intermediate Logic

Prerequisite(s): PHIL 124 or consent of instructor

PHIL 126 – Advanced Logic

Prerequisite(s): PHIL 124 with a grade of C- or better; or consent of instructor.

PHIL 130 – Theory of Knowledge

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 132 – Philosophy of Language

Prerequisite(s): upper-division standing or consent of instructor.

PHIL 133 – Metaphysics

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 134 – Philosophy of Mind

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 135 – Philosophy of Psychology

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 136 – Philosophy of Biology

Prerequisite(s): One course from Biology or another life science. CGIS 001 or PHIL 001 or PHIL 006 or PHIL 010 or PHIL 010H or PHIL 114 or PHIL 133 or PHIL 134 or PHIL 135 or PHIL 137 or PHIL 144.

PHIL 137 – Philosophy of Science

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 138 – Philosophy of Agency

Prerequisite(s): one course in philosophy or consent of instructor.

PHIL 139 – Philosophy of Mathematics

Prerequisite(s): PHIL 124 or one mathematics course or consent of instructor.

PHIL 140 – Topics in Metaphysics

Prerequisite(s): one course in philosophy or consent of instructor. PHIL 142 – Advanced Topics in the Philosophy of Language *Prerequisite(s): PHIL 107 or PHIL 132 or consent of instructor.*

PHIL 142 – Advanced Topics in the Philosophy of Language

Prerequisite(s): PHIL 107 or PHIL 132 or consent of instructor.

PHIL 144 – Advanced Topics in Philosophy of Mind

Prerequisite(s): PHIL 107 or PHIL 134 or consent of instructor.

PHIL 148 – Philosophy of Information

Prerequisite(s): CGIS 100 and PHIL 124.

PHIL 146 – Philosophy of Computer Science and Artificial Intelligence

Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering.

PHIL 147 – Pragmatics

Prerequisite(s): CS 011 / MATH 011 or LING 021 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 107 or PHIL 130 or PHIL 132.

PHIL 170 – Ethics of Artificial Intelligence

Prerequisite(s): Upper-division standing or consent of the instructor

PHIL 175 – Philosophy of Perception

Prerequisite(s): CGIS 001 or CS 011 / MATH 011 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 010 or PHIL 010H or PSYC 001.

PHIL 180 – Advanced Topics in Theory of Knowledge

Prerequisite(s): CS 011 / MATH 011 or PHIL 008 or PHIL 008H or PHIL 124; and at least one course from LING 151, PHIL 130, PHIL 131, PHIL 132, PHIL 133, PHIL 134, PHIL 136, PHIL 137, PHIL 139, PHIL 142, PHIL 143, PHIL 144, PHIL 148, PHIL 146, or PHIL 147.

Psychology

PSYC 110 – Brain and Behavior

Prerequisite(s): PSYC 001 with a grade of “C-” or better, or equivalents, or consent of instructor.

PSYC 112 – Neural Mechanisms of Animal Behavior

Prerequisite(s): CBNS 106 with a “C-” or better or PSYC 110 with a C- or better or consent of instructor.

PSYC 117 – Cognitive Neuroscience of Memory and Consciousness

Prerequisite(s): CBNS 106 with a “C-” or better or PSYC 110 with a C- or better.

PSYC 122 – Human Neuroimaging

Prerequisite(s): PSYC 110 or CBNS 106 or consent of instructor.

PSYC 122L – Human Neuroimaging Laboratory

Prerequisite(s): concurrent enrollment in PSYC 122; or consent of instructor.

PSYC 128 – Language and the Brain

Prerequisite(s): LING 020 or PSYC 110 or PSYC 135 or CBNS 106; or consent of instructor.

PSYC 130 – Fundamentals of Learning and Conditioning

Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 12 with grades of C- or better.

PSYC 131 – Computational and Mathematical Models in Cognitive Science

Prerequisite(s): a grade of “C-” or better in PSYC 001, PSYC 002, PSYC 011, PSYC 012 or consent of instructor.

PSYC 132 – Perception

Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor.

PSYC 133 – Human Factors

Prerequisite(s): a grade of “C-” or better in one of the following courses or consent of the instructor: PSYC 132 or PSYC 134.

PSYC 134 – Cognitive Processes

Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor.

PSYC 135 – Psycholinguistics

Prerequisite(s): a grade of “C-” or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012

PSYC 139 – Topics in Cognitive Psychology

Prerequisite(s): a grade of “C-” or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012; PSYC 132 or PSYC 134 or PSYC 135.

PSYC 163 – Cognitive Development

Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, and PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor

Statistics

STAT 108 – Data Science Ethics

*Prerequisite(s): CS 105 or STAT 107 or CS 171 / EE 142; or consent of instructor.
Cross-listed with CS 108.*

STAT 156A – Mathematical Statistics With Applications For Data Science

Prerequisite(s): MATH 009C with a grade of C- or better or MATH 09HC.

STAT 156B – Mathematical Statistics With Applications For Data Science II

Prerequisite(s): STAT 156A with a grade of C- or better.

STAT 160A Elements of Probability and Statistical Theory

Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently).

Appendix B. Catalog Copy for the New B.S. in Cognitive and Information Science

Cognitive Science Subject Abbreviation: CGIS

Department of Philosophy

College of Humanities, Arts, and Social Sciences

The **Cognitive and Information Science major** is the interdisciplinary study of thought and behavior. Cognitive and information science is concerned with how humans, animals, computers, and robots acquire, represent, manipulate, and use information. As an interdisciplinary field it combines research and theory from three central disciplines (computer science, cognitive psychology, and philosophy), and several closely related disciplines (anthropology, biology, linguistics, mathematics, neuroscience, and statistics). The major is not a substitute for majoring in any of its constituent fields but is an interdisciplinary major on its own. The general objectives for the B.S. in Cognitive and Information Science are to develop and provide a thorough foundation in the study of cognitive and information science, including artificial intelligence, drawing in perspectives from computer science, linguistics, philosophy, and psychology; to provide a foundation in cognitive science with which students will be able to pursue graduate education in cognitive science, computer science, linguistics, information science, philosophy, psychology, or related fields; and to provide a foundation for the pursuit of jobs in business and industry where a multidisciplinary background is highly desirable.

Upon completing the B.S. degree with a major in Cognitive and Information Science, students will be able to:

- Understand cognitive and information 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.
- 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 and information sciences.
- Achieve a depth of knowledge in one core area of the cognitive and information sciences – linguistics, computer science, 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.
- 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 and information 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.
- Demonstrate the ability to communicate original research or research by other scholars effectively and at a college level in written and oral formats.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

The major requirements for the B.S. degree in Cognitive and Information Science are as follows:

14 total courses. At least fifty-two (52) units of coursework including at least sixteen (16) lower-division units minimum and at least thirty-six (36) upper-division units minimum.

CGIS 001 (4 units)

One lower-division course in logic:

CS 011 / MATH 011 or PHIL 008 (4 units)

One lower-division course in programming:

CS 009A or CS 042 (4 units)

One additional lower-division course from the following:

CS 009B, LING 020, LING 021, PHIL 006, PHIL 007, PHIL 010, PHIL 010H, PSYC 001, PSYC 002, STAT 004, STAT 010 (4 units)

CGIS 100 and PHIL 124 (8 units)

Any three of the following upper-division courses: (12 units)

CGIS/PHIL 135, CGIS/PHIL 148, CGIS/PHIL 146, CGIS/PHIL 175, PHIL 170, PHIL 130, PHIL 134, PSYC 110

Any four of the following upper-division courses: (16 units)

Cognitive and Information Science: CGIS 135, CGIS 148, CGIS 146, CGIS 175

Computer Science and Engineering: CS 100, CS 105, CS 108, CS 111, CS 120A / EE 120A, CS 135, CS 141, CS 142, CS 144, CS 145, CS 150, CS 170, CS 172, CS 173

Linguistics: LING 121, LING 151, LING 162

Mathematics: MATH 121, MATH 144, MATH 149A, MATH 149B

Philosophy: PHIL 107, PHIL 114, PHIL 118, PHIL 125, PHIL 126, PHIL 130, PHIL 132, PHIL 133, PHIL 134, PHIL 135, PHIL 136, PHIL 137, PHIL 138, PHIL 139, PHIL 140, PHIL 142, PHIL 144, PHIL 148, PHIL 146, PHIL 147, PHIL 170, PHIL 175, PHIL 180

Psychology: PSYC 110, PSYC 112, PSYC 117, PSYC 120, PSYC 120L, PSYC 121, PSYC 122, PSYC 122L, PSYC 124, PSYC 125, PSYC 126, PSYC 127, PSYC 128, PSYC 129, PSYC 130, PSYC 131, PSYC 132, PSYC 133, PSYC 134, PSYC 135, PSYC 139, PSYC 163.

Statistics: STAT 108, STAT 156A, STAT 156B, STAT 160A

Students are urged to consult their undergraduate advisor in preparing their course of study each quarter while at UCR. Students are also urged to consult with their advisor on choosing a thematic path through their upper-division electives. Students should carefully consider pre-requisites when choosing a thematic path, as some paths have more pre-requisites than others. For instance:

- Students who plan to take upper-division courses in Computer Science and Engineering to fulfill their major electives should take CS 009A for their lower-division requirement and should also complete CS 009B, CS 009C, and CS 010C as pre-requisites for upper-division courses. Such students are then urged to take both CS 100 *and* CS 111 and are also recommended to take CS 105 *or* CS 141. CS 141 is a pre-requisite for many further CS courses. Students should be aware of the MATH pre-requisite for CS 009A.
- Students who plan to take upper-division *neuroscience* courses in Psychology (PSYC 120 through PSYC 128) to fulfill their upper-division electives should carefully consult the Catalog for pre-requisites. (Many of these courses are cross listed in CBNS.) Some of these courses have CBNS 106 as a pre-requisite. CBNS 106 itself requires BIO 005A, BIO 005B, CHEM 001A, CHEM 001B, CHEM 001C. Students should be aware of pre-requisites for these BIO and CHEM courses. Other courses in neuroscience require PSYC 001 and PSYC 110 instead. (Students may also take LING 020 to qualify for PSYC 128/LING 162 without PSYC 110 or CBNS 106.)
- Students who plan to take upper-division *cognition* courses in Psychology to fulfill their upper-division electives should take PSYC 001, PSYC 002, PSYC 011, and PSYC 012. They are pre-requisites for PSYC 129, PSYC 130, PSYC 131, PSYC 132, PSYC 133, PSYC 134, PSYC 135, and PSYC 139, as well as PSYC 163.
- Students who plan to take upper-division Mathematics or Statistics courses to fulfill their upper-division electives requirement should also carefully consult the pre-requisites for those courses.

Minor Requirements

The requirements for the minor in Cognitive and Information Science are as follows (5 courses, at least 20 units)

Lower-Division (3 courses, at least 12 units)

CGIS 001;

CS 011 / MATH 011 or PHIL 008 or PHIL 008H;

CS 009A or CS 042.

Upper-Division (2 courses, at least 8 units)

CGIS 100;

One the following: CGIS 135, CGIS 148, CGIS 146, CGIS 175, PHIL 124, PHIL 134, PHIL 170, or PSYC 110.

Appendix C. Two Sample Programs of Study

Neuroscience Elective Path

	Fall	Winter	Spring
Year One	ENGL 001A Foreign Lang 1 CGIS 001 MATH	ENGL 001B Foreign Lang 2 MATH PHIL 008	ENGL 001C/WASC Foreign Lang 3 PHIL 124 PSYC 001
Year Two	HIST 10/15/20 CS 009A LING 021 BIOLOGY	PSYC 110 FA/LIT/PHIL/RS NAT/MATH HUMANITIES	ELECTIVE NAT/MATH HUMANITIES PHYSICAL
Year Three	CGIS 100 ELECTIVE PHIL 134 HUMANITIES	PHIL 136 POLI/ECON ELECTIVE ETHNICITY	CGIS 135 PHIL 137 HUMANITIES ANTH/SOC/PSYC
Year Four	PSYC 122 PSYC 122L LINGUISTICS ELECTIVE	CGIS 148 HUMANITIES SCIENCE PHIL 180	PSYC 126 CGIS 146 LING 162 SCIENCE

Logic and Computation Elective Path

	Fall	Winter	Spring
Year One	ENGL 001A Foreign L 1 MATH CS 009A	ENGL 001B Foreign L 2 HIST 10/15/20 CS 009B	ENGL 001C/WASC Foreign L 3 CGIS 001 CS 009C
Year Two	PHIL 008 LING 020 ETHNICITY CS 010C	PHIL 124 MATH POLI/ECON FA/LIT/PHIL/RS	PHIL 125 CGIS 100 PHIL 134 MATH
Year Three	CS 100 LING 121 HUMANITIES PHIL 132	CS 111 LING 151 HUMANITIES PHIL 142	CS 141 NATURAL/MATH PHIL 146 ANTH/SOC/PSYC
Year Four	CS 170 PHIL 180 NATURAL/MATH PHYSICAL	HUMANITIES PHIL 148 PHIL 139 SOC SCI	SOC SCI PHIL 175 BIOLOGY BREADTH

Appendix D. Catalog Descriptions

CGIS (Cognitive and Information Science)

CGIS 001 Introduction to Cognitive and Information Science 4. Lecture, 3 hours. Discussion, 1 hour. An introduction to the interdisciplinary field of Cognitive and Information Science that studies the nature of minds, by incorporating findings from Anthropology, Artificial Intelligence, Computer Science, Information Science, Linguistics, Mathematics, Neuroscience, Philosophy, Psychology, and Statistics. Prerequisite(s): None.

CGIS 100 Cognition, Computation, and Information 4 Lecture, 3 hours; discussion, 1 hour. Advanced introduction to fundamental approaches to cognitive and information science. Topics include mental architecture, computation, information-processing, artificial intelligence, connectionism, neural networks, robotics, embodied cognition, with applications to various cognitive capacities, including perception, language, memory, reasoning, mind-reading, and decision-making. Prerequisite(s): CGIS 001; PSYC 001; PHIL 008 or PHIL 008H or CS 011 / MATH 011; and CS 009A or CS 042.

CGIS 135 Philosophy of Psychology 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Examines philosophical issues arising in the context of empirical psychology. Topics may include moral development, artificial intelligence and the modeling of cognition, the nature of perception and memory, fallacies in human reasoning, mechanisms of self-understanding, and mental illness and personhood. Credit is awarded for only one of PHIL 135 or PHIL 235. Cross listed with PHIL 135.

CGIS 148 Philosophy of Information 4. Lecture, 3 hours. Additional reading, 3 hours. Examines key issues in the philosophy of information, including theories of semantic and naturalistic information, informational ontologies, and the intersections of logic, computation, and cognition. Topics include informational pluralism, structural realism, digital ontology, semantic content, and the use of information in cognitive science and the biological sciences. Prerequisite(s): CGIS 100 and PHIL 124. Cross listed with PHIL 148.

CGIS 146 Philosophy of Computer Science and Artificial Intelligence 4. Lecture, 3 hours. Extra reading, 3 hours. An advanced introduction to the Philosophy of Computer Science. Topics include philosophy of science, the nature of computer science, computation, computer programs, artificial intelligence, and computer ethics. Prerequisites: Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering. Cross listed with PHIL 146.

CGIS 175 Fundamentals of Perception and Cognition 4. Lecture, 3 hours. Additional reading, 3 hours. Examines the nature of perception, especially vision, from a philosophically informed interdisciplinary point of view. Prerequisite(s): CGIS 001 or CS

011 / MATH 011 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 010 or PHIL 010H or PSYC 001. Cross listed with PHIL 175

CS (Computer Science and Engineering)

CS 009A Data Oriented Introduction to Computing I 4 Lecture, 3 hours; laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): MATH 004, may be taken concurrently or MATH 005A, may be taken concurrently or MATH 006A, may be taken concurrently or MATH 006B, may be taken concurrently or MATH 007A, may be taken concurrently or MATH 009A, may be taken concurrently or MATH 09HA, may be taken concurrently. Covers computational thinking, problem-solving, and data analysis using the Python language through application-based data manipulation tasks from science, engineering, business, and the humanities. Includes variables, expressions, branches, loops, functions, parameters, lists, strings, file I/O, and exception handling. Also covers software design, testing, and debugging. Credit is awarded for one of the following CS 009A or CS 010A.

CS 009B Data Oriented Introduction to Computing II 4 Lecture, 3 hours; laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): CS 009A; or equivalent. Covers advanced programming concepts and algorithms through application-based data manipulation tasks from science, engineering, business, and the humanities. Emphasizes good programming principles in the design and development of substantial programs using the Python language. Topics include abstract data types, objects and classes, recursion, and basic software engineering principles. Credit is awarded for one of the following CS 009B or CS 010B.

CS 009C C++ For Programmers 2 Lecture, 1 hour; laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): CS 009B, may be taken concurrently; MATH 006B, may be taken concurrently or MATH 007A, may be taken concurrently or MATH 005A, may be taken concurrently or MATH 004, may be taken concurrently or MATH 009A, may be taken concurrently or MATH 09HA, may be taken concurrently. Introduces the constructs provided in the C++ programming language for procedural and object-oriented programming. For those with prior programming experience.

CS 010C Introduction to Data Structures and Algorithms 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010B with a grade of C- or better or CS 009C with a grade of C- or better; proficiency in C++. Topics include basic data structures such as arrays, lists, stacks, and queues. Covers dictionaries (including binary search trees and hashing) and priority queues (heaps). Offers an introductory analysis of algorithms, sorting algorithms, and object-oriented programming including abstract data types, inheritance, and polymorphism. Explores solving complex problems through structured software development.

CS 011 / MATH 011. Introduction to Discrete Structures 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 007A or MATH 009A or MATH 09HA; CS 010A or MATH 007B or MATH 009B or MATH 09HB. Introduction to basic concepts of discrete

mathematics emphasizing applications to computer science. Topics include propositional and predicate calculi, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability.

CS 042 A Hitchhiker's Guide to Artificial Intelligence (ai) 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Surveys basic concepts and techniques underpinning modern AI including problem solving, automated reasoning, game AI, vision and language, neural networks, and robotics. Explores history, ethics, use cases, and applications. Introduces basic use of Python for building and using AI but expects no prior experience. Intended for non-engineering majors.

CS 061 Machine Organization and Assembly Language Programming 4 Lecture, 3 hours; laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): CS 010A with a grade of C- or better. An introduction to computer organization. Topics include number representation, combinational and sequential logic, computer instructions, memory organization, addressing modes, interrupt, input/output (I/O), assembly language programming, assemblers, and linkers.

CS 100 Software Construction 5 Lecture, 3 hours; laboratory, 2 hours, discussion, 1 hour; individual study, 1 hour. Prerequisite(s): CS 010C with a grade of C- or better. Emphasizes development of software systems. Topics include design and implementation strategies and selection and mastery of programming languages, environment tools, and development processes. Develops skills in programming, testing, debugging, performance evaluation, component integration, maintenance, and documentation. Covers professional and ethical responsibilities and the need to stay current with technology.

CS 105 Data Analysis Methods 4 Lecture, 3 hours; laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): CS 009B with a grade of C- or better or CS 010B with a grade of C- or better; restricted to class level standing of sophomore, junior, senior, or masters. An introduction to fundamental concepts and methods in data analysis and visualization essential to a variety of data science tasks. Designed to provide preparation for the data science major and for advanced courses in data analysis and applications of data science.

CS 108 Data Science Ethics 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 105 or STAT 107 or CS 171 / EE 142; or consent of instructor. Covers ethics specifically related to data science. Topics include data privacy; data curation and storage; discrimination and bias arising in the machine learning process; statistical topics such as generalization, causality, curse of dimensionality, and sampling bias; data communication; and strategies for conceptualizing, measuring, and mitigating problems in data-driven decision-making. *Cross-listed with STAT 108.*

CS 111 Discrete Structures 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010A; CS 011 / MATH 011; MATH 009C or MATH 09HC; MATH 031 or EE 020B. A study of discrete mathematical structures emphasizing applications to computer science.

Topics include number theory and cryptography, asymptotic notation, recurrence equations, counting methods, elements of graph theory, and trees.

CS 120A Logic Design 5 Lecture, 3 hours; laboratory, 3 hours; individual study, 3 hours. Prerequisite(s): CS 061 with a grade of C- or better. Covers design of digital systems. Includes Boolean algebra; combinational and sequential logic design; design and use of arithmetic logic units, carry lookahead adders, multiplexors, decoders, comparators, multipliers, flip-flops, registers, and simple memories; state-machine design; and basic register-transfer level design. Uses hardware description languages, synthesis tools, programmable logic, and significant hardware prototyping. Cross-listed with EE 120A

CS 135 Virtual Reality 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 100. Covers the development of virtual reality (VR) worlds, including motion and physics of VR worlds. Includes design practices for immersive experiences, human visual perception, environmental and social interactions. Also includes positional tracking with sensors, augmented and mixed reality, and storage and transmission of virtual reality worlds.

CS 141 Intermediate Data Structures and Algorithms 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010C with a grade of C- or better; CS 111; MATH 009C or MATH 09HC; proficiency in C++. Explores basic algorithm analysis using asymptotic notations, summation and recurrence relations, and algorithms and data structures for discrete structures including trees, strings, and graphs. Also covers general algorithm design techniques including “divide-and-conquer,” the greedy method, and dynamic programming. Integrates knowledge of data structures, algorithms, and programming.

CS 142 Algorithm Engineering 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 100, CS 141; or equivalent. Covers the design and implementation of sequential, parallel, cache-efficient, external-memory, and write-efficient algorithms for fundamental computational problems including sorting, searching, as well as a selection of problems in algebra, geometry, combinatorial optimization, and string processing. Emphasizes practical aspects of algorithm design, efficient implementation, and experimental methodology for performance evaluation.

CS 144 Algorithms for Bioinformatics 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 141. Introduces fundamental algorithms and data structures for solving analytical problems in molecular biology and genomics. Includes exact and approximate string matching; sequence alignment; genome assembly; and gene and regulatory motifs recognition. Credit is awarded for one of the following CS 144, CS 234, or CS 238.

CS 145 Combinatorial Optimization Algorithms 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 141; MATH 031 or MATH 131. The study of efficient algorithm design techniques for combinatorial optimization problems. Topics include shortest paths, minimum spanning trees, network flows, maximum matchings, stable matchings,

linear programming, duality, two-person games, algorithmic techniques for integer programming problems, NP completeness, and approximation algorithms.

CS 150 Automata and Formal Languages 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 010C with a grade of C- or better; CS 111; MATH 009C or MATH 09HC. A study of formal languages. Includes regular and context-free languages; computational models for generating these languages such as finite-state automata, pushdown automata, regular expressions, and context-free grammars; mathematical properties of the languages and models; and equivalence between the models. Also introduces Turing machines and decidability

CS 170 Introduction to Artificial Intelligence 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 100 with a grade of “C-” or better, CS 111. An introduction to the field of artificial intelligence. Focuses on discrete-valued problems. Covers heuristic search, problem representation, and classical planning. Also covers constraint satisfaction and logical inference.

CS 173 Introduction to Natural Language Processing 4 Lecture, 3 hours; discussion, 1

hour. Prerequisite(s): CS 100; CS 111; EE 114 or STAT 155. An overview of modern approaches for natural language processing. Focuses on major algorithms used in NLP for various applications such as part-of-speech tagging, parsing, named entity recognition, coreference resolution, sentiment analysis, and machine translation.

LING (Linguistics)

LING 020 Language and Linguistics 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): none. An introduction to modern linguistics. Covers the nature of language; language structure; grammars; the languages of the world; historical and comparative linguistics; and interdisciplinary approaches including anthropological and psycholinguistics.

LING 021 Grammar 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none.

Fundamental concepts of grammatical structure. Includes parts of speech, paradigms, word families, agreement and government, the grammar of sentences and longer units of discourse, and style.

LING 121 Syntax 4 Lecture, 3 hours; individual study, 2 hours; research, 2 hours; extra reading, 1 hour. Prerequisite(s): LING 020. Survey of various approaches to syntax including transformational. Examines syntactic structures of English and other languages. Applies to: English, foreign languages, philosophy, and mathematics.

LING 151 Semantics 4 Lecture, 3 hours; extra reading, 1 hour; outside research, 1 hour; term paper, 1 hour. Prerequisite(s): LING 121. Introduces the study of meaning and its

metalinguistic preliminaries. Explores lexical, sentence, and utterance meaning (including speech acts, text, and discourse). Provides a survey of theories of meaning, such as structural semantics and language as a semiotic system.

LING 162 Language and the Brain 4 Lecture, 3 hours; research, 2 hours; extra reading, 2 hours. Prerequisite(s): LING 020 or PSYC 110 or PSYC 135 or CBNS 106; or consent of instructor. Interdisciplinary introduction to the study of language and the brain. Includes brain evolution for language, neural bases for language production and language comprehension, aphasiology and language disorders, and additional special topics. *Cross-listed with PSYC 128.*

MATH (Mathematics)

MATH 011 / CS 011. Introduction to Discrete Structures 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 007A or MATH 009A or MATH 09HA; CS 010A or MATH 007B or MATH 009B or MATH 09HB. Introduction to basic concepts of discrete mathematics emphasizing applications to computer science. Topics include propositional and predicate calculi, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability.

MATH 121 Game Theory 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better. Examines games in extensive, normal, and characteristic form as models of conflict and/or cooperation. Covers two-person zero-sum games, minimax theorem, and relation to linear programming. Includes non-zero-sum games, Nash equilibrium theorem, bargaining, the core, and the Shapley value. Addresses economic market games.

MATH 144 Introduction to Set Theory 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better. Covers algebra of subsets of a set. Addresses algebra of relations and functions. Explores cardinal and ordinal numbers and their arithmetic operations. Includes the wellordering theorem, transfinite induction, and Zorn’s lemma.

MATH 149A Probability and Mathematical Statistics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better, MATH 010B with a “C-” or better, concurrent enrollment in or completion of MATH 046 with a grade of “C-” or better. An introduction to the mathematical theory of probability and discrete and continuous distributions.

MATH 149B Probability and Mathematical Statistics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better, MATH 010B with a grade of “C-” or better, MATH 046 with a grade of “C-” or better, MATH 149A with a grade of “C-” or better. A continuation of MATH 149A. Topics include sampling and limit distributions.

PHIL (Philosophy)

PHIL 001 Introduction to Philosophy 4 Lecture, 3 hours, discussion, 1 hour.

Prerequisite(s): none. An introductory exploration into the nature of the individual, his/her place in the universe, and the forces that shape his/her destiny. Credit is awarded for only one of PHIL 001 or PHIL 001H. PHIL 001H Honors Introduction to Philosophy 4 Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to University Honors or consent of instructor. Honors course corresponding to PHIL 001. An introductory course designed to explore a small number of classical texts central to philosophy and the liberal arts and sciences. Students examine issues surrounding the nature of knowledge, the foundations of moral philosophy, and the relation of both to the development of the human and natural sciences. Texts may vary from year to year and include works by such authors as Plato, Aristotle, Descartes, Hobbes, Hume, and Kant. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 001 or PHIL 001H.

PHIL 006 Reason, Belief, and Truth 4 Lecture, 3 hours; discussion, 1 hour;

Prerequisite(s): none. An introductory examination of the nature of reason, rationality, argument, proof, and persuasion and the nature of theory, belief, faith and conviction, and truth and falsity. Discusses the various bodies of belief and modes of inquiry, such as the natural and social sciences, the humanities, morality, religion, and mathematics.

PHIL 007 Introduction to Critical Thinking 4 Lecture, 3 hours, discussion, 1 hour.

Prerequisite(s): none. A practical examination of reasoning and argument typically illustrated. Credit is awarded for only one of PHIL 007 or PHIL 007H.

PHIL 008 Introduction to Logic 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): none. An introduction to symbolic logic. Teaches how to distinguish, in a preCGISE way, valid deductive arguments from those that are invalid; includes learning to use logical symbolism, truth tables, and formal deductions. Credit is awarded for only one of PHIL 008 or PHIL 008H.

PHIL 008H Honors Introduction to Logic 4 Lecture, 3 hours, discussion, 1 hour.

Prerequisite(s): admission to University Honors or consent of instructor. Honors course corresponding to PHIL 008. An introduction to symbolic logic. Teaches how to distinguish, in a preCGISE way, valid deductive arguments from those that are invalid; includes learning symbolism, truth tables, and formal deductions. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 008 or PHIL 008H.

PHIL 010 Language, Mind, and Reality 4 Lecture, 3 hours, discussion, 1 hour.

Prerequisite(s): none. Explores the nature of language, communication, and mentality and their role in shaping our thought and experience of the world. Tackles questions about the innateness of concepts, the social and rational norms governing communication, the

nature of speech acts and their connection to hate speech and pornography, and the scope of mentality. Credit is awarded for only one of PHIL 010 or PHIL 010H.

PHIL 010H Honors Language, Mind, and Reality 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): admission to University Honors or consent of instructor. Honors course corresponding to PHIL 010. Explores the nature of language, communication, and mentality and their role in shaping our thought and experience of the world. Tackles questions about the innateness of concepts, the social and rational norms governing communication, the nature of speech acts and their connection to hate speech and pornography, and the scope of mentality. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 010 or PHIL 010H.

PHIL 107 Languages and Minds 4 Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): one course in philosophy or consent of instructor. An investigation of interrelated issues in the philosophy of mind and language, including the mind-body relation, theories of meaning, how thoughts and language represent states of affairs in the world, and the nature of consciousness.

PHIL 114 Science and Human Understanding 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Discusses how contemporary philosophers have examined human understanding as exemplified in science.

PHIL 118 Personhood and Personal Identity 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Develops the basic elements of the concept of personhood, and how persons are alleged to be crucially different from non-human animals. Various theories are considered about what is essential to us as individuals and what makes us the same person over time. Explores the relationship between these metaphysical issues and moral issues, such as euthanasia, animals' rights, and abortion

PHIL 124 Formal Logic 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 011 / MATH 011 or CS 120A/EE 120A or CS 150 or PHIL 008 or PHIL 008H or consent of instructor. An introduction to first-order logic, the core of the logic often used in contemporary philosophy, mathematics, computer science, and linguistics.

PHIL 125 Intermediate Logic 4 Lecture, 3, hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): PHIL 124 or consent of instructor. The basic metatheory of first order logic; with an emphasis on the precise relation between its syntax (formulas, rules of inference, and proofs) and semantics (interpretations, truth, validity), leading to the soundness and completeness theorems.

PHIL 126 Advanced Logic 4 Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): PHIL 124 with a grade of C- or better; or consent of instructor. Advanced metatheory of first-order logic, leading to a discussion of some of the important

incompleteness, undecidability, and non expressability results of twentieth-century logic. Includes the writings of Gödel, Church, and Turing.

PHIL 127 Advanced Topics in Logic 4 Lecture, 3 hours; extra reading, 1 hour; activity, 3 hours. Prerequisite(s): PHIL 124 with a grade of C- or better; or consent of instructor. A study of selected non-truth-functional and nonstandard logics. Includes modal logics, tense logics, free logics, paraconsistent logics, and set theory. Course is repeatable.

PHIL 130 Theory of Knowledge 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An inquiry into the nature of human knowledge--its possibility, criteria, scope, and limitations. Credit is awarded for only one of PHIL 130 or PHIL 230.

PHIL 132 Philosophy of Language 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of some of the traditional issues in the philosophy of language, such as analyticity, theories of reference, truth, speech act theory, and philosophical theories of formal grammars. Credit is awarded for only one of PHIL 132 or PHIL 232.

PHIL 133 Metaphysics 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An investigation of some of the traditional problems in Western philosophy that have been labeled metaphysical, such as the existence of God, the relationship between mind and body, the determinism versus free will debate, and the nature of time and space. Credit is awarded for only one of PHIL 133 or PHIL 233.

PHIL 134 Philosophy of Mind 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. A study of several theories of the nature of mind and an analysis of particular issues occasioned by them: the mind-body problem, personal identity, emotions, human action, self-knowledge, knowledge of other minds, and explanations of human behavior. Credit is awarded for only one of PHIL 134 or PHIL 234.

PHIL 135 Philosophy of Psychology 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Examines philosophical issues arising in the context of empirical psychology. Topics may include moral development, artificial intelligence and the modeling of cognition, the nature of perception and memory, fallacies in human reasoning, mechanisms of self-understanding, and mental illness and personhood. Credit is awarded for only one of PHIL 135 or PHIL 235.

PHIL 136 Philosophy of Biology 4. Lecture, 3 hours. Additional reading, 3 hours. Examines philosophical issues central to the life sciences. Topics include life, evolutionary theory, fitness, the units of selection, information, genetic and epigenetic inheritance, and the evolution of minds. Prerequisite(s): One course from Biology or

another life science. CGIS 001 or CGIS 100 or PHIL 001 or PHIL 006 or PHIL 010 or PHIL 010H or PHIL 114 or PHIL 133 or PHIL 134 or PHIL 135 or PHIL 137 or PHIL 144.

PHIL 137 Philosophy of Science 4 Lecture, 3 hours; extra reading, 3 hours.

Prerequisite(s): one course in philosophy or consent of instructor. Topics discussed include understanding scientific objectivity in the light of history and sociology of science; realism and anti-realism about scientific theories; scientific methodology and its logic; and the nature of scientific explanation. Credit is awarded for only one of PHIL 137 or PHIL 237.

PHIL 138 Philosophy of Agency 4 Lecture, 3 hours; extra reading, 3 hours.

Prerequisite(s): one course in philosophy or consent of instructor. An investigation of problems that arise in attempts to understand human agency: the nature and explanation of action, intention, free will and moral responsibility, and weakness of will. Credit is awarded for only one of PHIL 138 or PHIL 238.

PHIL 139 Philosophy of Mathematics 4 Lecture, 3 hours; extra reading, written work, homework problems, 3 hours. Prerequisite(s): PHIL 124 or one mathematics course or consent of instructor. Discusses topics such as the abstract nature of mathematical objects, the sources of mathematical knowledge, the relation between mathematics and logic, and the infinite in mathematics. Considers the development of some selected parts of mathematics (especially arithmetic, geometry, algebra, and set theory) and of various corresponding philosophical positions (platonism, formalism, intuitionism, structuralism). Course is repeatable as content changes. Credit is awarded for only one of PHIL 139 or PHIL 239.

PHIL 140 Topics in Metaphysics 4 Lecture, 3 hours; extra reading, 3 hours.

Prerequisite(s): one course in philosophy or consent of instructor. An in-depth discussion of selected issues in contemporary metaphysics, such as abstract objects, essentialism and identity, laws of nature, free will, and determinism. Course is repeatable as content changes.

PHIL 142 Advanced Topics in the Philosophy of Language 4 Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): PHIL 107 or PHIL 132 or consent of instructor. An in-depth study of a particular topic in the philosophy of language. Potential topics include context-sensitivity (how the meaning of a sentence depends upon nonlinguistic facts about context); theories of meaning (e.g., the Frege-Russell account in terms of propositions, the Lewis-Stalnaker possible worlds account, and Davidson's truth theory account). Course is repeatable as content changes to a maximum of 8 units. Credit is awarded for only one of PHIL 142 or PHIL 242.

PHIL 144 Advanced Topics in Philosophy of Mind 4 Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): PHIL 107 or PHIL 134 or consent of instructor. Examines a selected topic in philosophy of mind. Potential topics include consciousness and self-consciousness; intentionality and theories of mental content;

mental causation; consciousness and free will; introspection and knowledge of other minds; perception; emotion; imagination; concepts and rationality; artificial minds; and animal minds. Course is repeatable as content changes to a maximum of 8 units. Credit is awarded for only one of PHIL 144 or PHIL 244

PHIL 148 Philosophy of Information 4. Lecture, 3 hours. Additional reading, 3 hours. Examines key issues in the philosophy of information, including theories of semantic and naturalistic information, informational ontologies, and the intersections of logic, computation, and cognition. Topics include informational pluralism, structural realism, digital ontology, semantic content, and the use of information in cognitive science and the biological sciences. Prerequisite(s): CGIS 100 and PHIL 124.

PHIL 146 Philosophy of Computer Science and Artificial Intelligence 4. Lecture, 3 hours. Extra reading, 3 hours. An advanced introduction to the Philosophy of Computer Science. Topics include philosophy of science, the nature of computer science, computation, computer programs, artificial intelligence, and computer ethics. Prerequisites: Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering.

PHIL 147 Pragmatics 4. Lecture, 3 hours. Additional Reading, 3 hours. An upper-division introduction to the study of language use in context. Topics include implicature, presupposition, speech acts, relevance theory, and the semantics-pragmatics interface. Emphasis on theoretical frameworks and empirical data from linguistics, philosophy of language, and cognitive science. Prerequisites: CS 011 / MATH 011 or LING 021 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 107 or PHIL 130 or PHIL 132.

PHIL 170 Ethics of Artificial Intelligence 4. Lecture, 3 hours. Additional Reading, 3 hours. An upper-division examination of the ethics of artificial intelligence, including algorithmic bias, rights of AI entities, and societal impacts. Prerequisites: Upper-division standing or consent of the instructor.

PHIL 175 Philosophy of Perception 4. Lecture, 3 hours. Additional reading, 3 hours. Examines the nature of perception, especially vision, from a philosophically informed interdisciplinary point of view. Prerequisite(s): CGIS 001 or CS 011 / MATH 011 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 010 or or PHIL 010H or PSYC 001

PHIL 180 Advanced Topics in Theory of Knowledge 4. Lecture, 3 hours. Additional reading, 3 hours. Prerequisite(s): CS 011 / MATH 011 or PHIL 008 or PHIL 008H or PHIL 124; and at least one course from LING 151, PHIL 130, PHIL 131, PHIL 132, PHIL 133, PHIL 134, PHIL 136, PHIL 137, PHIL 139, PHIL 142, PHIL 143, PHIL 144, PHIL 148, PHIL 146, or PHIL 147. Examines key issues in contemporary research in the theory of knowledge. Topics may include the analysis of knowledge, recent work on radical skepticism, empirical findings relevant to theories of knowledge, semantic and contextualist approaches, social epistemology, and feminist approaches to knowledge. Course is repeatable for a maximum of 12 units as topics vary with consent of the instructor.

PSYC (Psychology)

PSYC 001 Introductory Psychology 4 Lecture, 3 hours; discussion, 1 hour. An introduction to psychology as an experimental science. Emphasizes topics in cognitive (including learning, memory, sensation, perception), comparative, and physiological psychology.

PSYC 002 Introductory Psychology 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Emphasizes topics in developmental psychology, tests and measurements, social psychology, personality, and abnormal behavior.

PSYC 011 Psychological Methods: Statistical Procedures 5 Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): MATH 004 with a grade of C- or better or MATH 005A with a grade of C- or better or MATH 006A with a grade of C- or better or MATH 006B with a grade of C- or better or MATH 007A with a grade of C- or better or MATH 007B with a grade of C- or better or MATH 009A with a grade of C- or better or MATH 09HA with a grade of B or better or MATH 009B with a grade of C- or better or MATH 09HB with a grade of B or better or MATH 009C with a grade of C- or better or MATH 09HC with a grade of B or better or MATH 010A with a grade of C- or better or MATH 010B with a grade of C- or better or MATH 022 with a grade of C- or better; PSYC 001 with a grade of C- or better; PSYC 002 with a grade of C- or better; or a score on the Math Advisory Exam sufficient for placement into MATH 005A or MATH 022 or higher. Covers descriptive and inferential statistics, measures of central tendency, variability, and correlation. Introduces sampling distributions, statistical inference, and hypothesis testing.

PSYC 012 Psychological Methods: Research Procedures 6 Lecture, 3 hours; laboratory, 3 hours; research, 3 hours; term paper, 1 hour; extra reading, 2 hours. Prerequisite(s): ENGL 001B with a grade of C or better; PSYC 001 with a grade of C- or better; PSYC 002 with a grade of C- or better; PSYC 011 with a grade of C- or better; MATH 004 with a grade of C- or better or MATH 005A with a grade of C- or better or MATH 006A with a grade of C- or better or MATH 006B with a grade of C- or better or MATH 007A with a grade of C- or better or MATH 007B with a grade of C- or better or MATH 009A with a grade of C- or better or MATH 09HA with a grade of B or better or MATH 009B with a grade of C- or better or MATH 09HB with a grade of B or better or MATH 009C with a grade of C- or better or MATH 09HC with a grade of B or better or MATH 010A with a grade of C- or better or MATH 010B with a grade of C- or better or MATH 022 with a grade of C- or better; or equivalent; a score on the Math Advisory Exam sufficient for placement into MATH 005A or MATH 022 or higher; consent of instructor is required for students repeating the course. A systematic survey of research methodologies in psychology. Laboratory assignments include evaluating and testing psychological theories; assessing methodologies and research designs; designing and implementing research; collecting data and analyzing statistics; writing research reports; and discussing ethical issues in science.

PSYC 110 The Brain and Behavior 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): PSYC 001 with a grade of "C-" or better, or equivalents, or consent of instructor. Explores the principles of neuroanatomy and neurophysiology and their relationship to brain function. Topics include sensory and perceptual processes, biological aspects of learning and memory, motivation, emotion, language, and abnormal behavior.

PSYC 112 Neural Mechanisms of Animal Behavior 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 with a grade of "C-" or better or PSYC 110 with a grade of "C-" or better or consent of instructor. Studies how the nervous systems of vertebrates and invertebrates contribute to and control their behavior. Focuses on aspects of sensory physiology with a brief orientation to the structure and function of nervous systems. Emphasizes a top-down approach to neurobiology, with specific behaviors providing guidelines for an examination of neural mechanisms.

PSYC 117 Cognitive Neuroscience of Memory and Consciousness 4 Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): CBNS 106 with a grade of "C-" or better or PSYC 110 with a grade of "C-" or better. Surveys the neural basis of mental processes, focusing on memory and consciousness and their behavioral manifestations. Emphasizes current research literature.

PSYC 120 Cellular Neuroscience: Membrane and Synaptic Phenomena 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. An examination of cellular and molecular mechanisms of nervous system function using concepts drawn from the study of vertebrates and invertebrates with emphasis on mammalian systems. *Cross-listed with CBNS 120.*

PSYC 120L Neuroscience Laboratory 4 Lecture, 1 hour; discussion, 1 hour; laboratory, 3 hours; written work, 3 hours. Prerequisite(s): CBNS 120, may be taken concurrently or PSYC 120, may be taken concurrently; or consent of instructor. Laboratory experiments using electrophysiological, chemical, and anatomical research methods fundamental to understanding neurons and neural systems. *Cross-listed with CBNS 120L.*

PSYC 121 Developmental Neuroscience 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. A study of the development of nervous systems. Examines the cellular and molecular mechanisms of neural development and the determinants of cell birth and death, axonal pathfinding, neuronal connections, and development of neural systems underlying behavior. *Cross-listed with CBNS 121.*

PSYC 122 Human Neuroimaging 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 110 or CBNS 106 or consent of instructor. PSYC 122 can be taken without PSYC 122L. An introduction to magnetic resonance imaging in psychological research with an emphasis on the merits and limitations of structural and functional neuroimaging in humans.

PSYC 122L Human Neuroimaging Laboratory 2 Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): concurrent enrollment in PSYC 122; or consent of instructor. Laboratory exercises in the design, acquisition, and analysis of structural and functional magnetic resonance imaging data.

PSYC 123L Computational Neurophysiology Laboratory: Simulating Neuronal Membrane Properties 4 Lecture, 1 hour; discussion, 1 hour; laboratory, 3 hours; written work, 3 hours. Prerequisite(s): CBNS 106; CBNS 120, may be taken concurrently or PSYC 120, may be taken concurrently; and consent of instructor. Introduces computer modeling techniques used to enhance understanding of neuronal membrane physiology. Selected topics include biophysical models of single neurons including passive properties and action potential firing, channels regulating neuronal firing properties, synaptic interactions, and simple circuits. *Cross-listed with CBNS 130L.*

PSYC 124 Systems Neuroscience 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 with a grade of C- or better; or consent of instructor. A study of the structure and function of motor and sensory systems in vertebrate and invertebrate nervous systems. *Cross-listed with CBNS 124.*

PSYC 125 Neuropharmacology 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120. Examines synaptic neurotransmitter systems, mechanisms, and pharmacological agents and effects, which are fundamental to neural information processing. *Cross-listed with CBNS 125.*

PSYC 126 Neuroscience of Learning and Memory 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110; or consent of instructor. Covers mechanisms of learning and memory across levels of analysis including genetic, neuronal, systems, and theory. Topics include the multiple memory systems, memory consolidation, working memory, emotional memory, recognition memory, spatial memory, and human amnesia. *Cross-listed with CBNS 126.*

PSYC 127 Behavioral Control Systems 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120; CBNS 124/PSYC 124 strongly recommended. An analysis of neural mechanisms that underlie behavior, concentrating on motor control. Topics range from command systems, to central pattern generators, to cortical control of voluntary movement and brain-machine interfaces (neuroprosthetics). *Cross-listed with CBNS 127.*

PSYC 128 Language and the Brain 4 Lecture, 3 hours; research, 2 hours; extra reading, 2 hours. Prerequisite(s): LING 020 or PSYC 110 or PSYC 135 or CBNS 106; or consent of instructor. Interdisciplinary introduction to the study of language and the brain. Includes brain evolution for language, neural bases for language production and language comprehension, aphasiology and language disorders, and additional special topics. *Crosslisted with LING 162.*

PSYC 129 Human Neuropsychology 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): PSYC 001 with a grade of C- or better; PSYC 002 with a grade of C- or better; PSYC 011 with a grade of C- or better; PSYC 012 with a grade of C or better; or consent of instructor. Surveys how high-level psychological functions (e.g., perception, memory, language) are organized in the human brain. Covers behavioral and cognitive impairments due to disorders such as brain injury, stroke, Parkinson's disease, epilepsy, and dementias including Alzheimer's disease. Emphasizes how such disorders inform our understanding of cognitive functions.

PSYC 130 Fundamentals of Learning and Conditioning 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. A survey course that includes both historical and current models of human learning, conditioning, and memory. Provides a good foundation for research or future study in learning and memory by covering fundamental theories established by Pavlov and Skinner while incorporating new theories of human behavioral control.

PSYC 131 Computational and Mathematical Models in Cognitive Science 4 Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of "C-" or better in PSYC 001, PSYC 002, PSYC 011, PSYC 012 or consent of instructor. Introduces students to the technical and theoretical issues involved in using models to understand behavior. Involves analysis of model predictions and simulation of behavioral data. Course is repeatable to a maximum of 12 units if taken with different instructors.

PSYC 132 Perception 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. An analysis of the role played by sensory mechanisms, experiences, expectations, and needs in recognizing objects in the environment.

PSYC 133 Human Factors 4 Lecture, 3 hours; extra reading, 3 hours; term paper, 1 hour. Prerequisite(s): a grade of "C-" or better in one of the following courses or consent of instructor: PSYC 132 or PSYC 134. Provides an overview of the human capabilities and limitations considered in the design of person machine systems. Evaluates factors critical to performance in person-machine systems, including attention, decision making, motor performance, and memory.

PSYC 134 Cognitive Processes 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. Empirical and theoretical research in several subareas within contemporary cognitive psychology. These subareas include attention, mental representation, information organization and retrieval from memory, psycholinguistics, problem solving, decision making, thinking, and artificial intelligence and computer simulation of cognitive processes.

PSYC 135 Psycholinguistics 4 Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001,

PSYC 002, PSYC 011, PSYC 012. Introduction to psycholinguistics emphasizing the psychological implications of linguistic theory, including the effect of syntactic structure on the comprehension, production, and retention of speech; the course of language acquisition; and models of the adult language user.

PSYC 136 Topics in Cognitive Neuroscience 4 Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of “C-” or better in one of the following courses or consent of instructor: CBNS 106, PSYC 110, PSYC 129, PSYC 132, PSYC 134, PSYC 135. Intensive study of selected topics in cognitive neuroscience. Stresses the methodology and interpretation of current research topics. Course is repeatable as topics change to a maximum of 12 units.

PSYC 139 Topics in Cognitive Psychology 4 Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of “C-” or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012; PSYC 132 or PSYC 134 or PSYC 135. Intensive study in cognitive psychology. Stresses literature, methodology, and experimental design and analysis. Course is repeatable as topics change to a maximum of 16 units

PSYC 163 Cognitive Development 5 Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, and PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor. An analysis of intellectual development from birth through maturity and into stages of aging. Discusses historical and contemporary theoretical and experimental approaches to studying the mechanisms of intellectual growth and development.

STAT (Statistics)

STAT 004 Elements of Data Science 4 Lecture, 3 hours; discussion, 1 hour.
Prerequisite(s): none. Explores basic concepts, algorithms, and techniques of data science with simulation and data visualization. Topics include summarizing and visualizing data using R or Python, causality, randomness, decision making in the presence of uncertainty, prediction, and classification. Credit is not awarded for STAT 004 if it has already been awarded for STAT 008, STAT 010, or STAT 011.

STAT 010 Introduction to Statistics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 005A or MATH 006B or MATH 007A or MATH 009A or MATH 09HA. A general introduction to descriptive and inferential statistics. Topics include histograms; descriptive statistics; probability; normal and binomial distributions; sampling distributions; hypothesis testing; and confidence intervals. Credit is awarded for one of the following STAT 010 or STAT 008.

STAT 108 Data Science Ethics 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 105 or STAT 107 or CS 171 / EE 142; or consent of instructor. Covers ethics specifically related to data science. Topics include data privacy; data curation and storage;

discrimination and bias arising in the machine learning process; statistical topics such as generalization, causality, curse of dimensionality, and sampling bias; data communication; and strategies for conceptualizing, measuring, and mitigating problems in data-driven decisionmaking. Cross-listed with CS 108.

STAT 156A Mathematical Statistics With Applications For Data Science I 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C with a grade of C- or better or MATH 09HC. Introduction to frequentist probability concepts, random variables, and their distributions. Discusses key theorems and inequalities in probability theory. Introduces to frequentist methods of point and interval estimation.

STAT 156B Mathematical Statistics With Applications For Data Science II 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 156A with a grade of C- or better. Topics include illustrative applications of Frequentist theory to linear regression; logistic regression and ANOVA; introduction to Bayes' rule, Bayesian probability concepts, and credible intervals; analysis of contingency tables; applications of sequential statistics; and methods for observational studies and missing data.

STAT 160A Elements of Probability and Statistical Theory 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently). Topics include statistical regularity, probability spaces, fundamental theorems in discrete probability, Bayes' theorem, random variables, densities and distribution functions, and continuous distributions.

Appendix E. Written Approvals

This section contains letters from the following department chairs:

Comparative Literature & Languages (Linguistics)

Computer Science and Engineering

Mathematics

Molecular, Cell and Systems Biology

Philosophy

Psychology

Statistics

Jan 23, 2026

Dear Prof. Graham,

Many thanks for reaching out regarding the proposed new major in Cognitive and Information Science. This is a wonderful new opportunity which will surely be of interest to many UCR undergrads.

There are 2 faculty in our Department who would be a great fit to serve on the major committee: Prof. Vrinda Chidambaram and Prof. Emily Graham. Both are Linguists and teach courses that will be of interest to Cognitive and Information Science students, and which fit well under the rubric “Upper-Division Electives”: LING 121, Syntax, LING 151, Semantics, LING 162, Language and the Brain, and LING 168 (newly approved), Statistics for Linguistics.

As well, we regularly offer LING 20, Language and Linguistics, and LING 21, Grammar, which support and complement the new major under as “Interdisciplinary Foundations” (among other courses a student may select).

With all best wishes,

Jeff Sacks
Professor and Chair



Bourns College of Engineering
Department of Computer Science & Engineering
900 University Avenue
Riverside, CA 92521

January 23, 2026

Dear Professor Graham:

I have reviewed your proposal for an undergraduate major in Cognitive & Information Science (CGIS). There are two aspects of the major that might directly impact the Department of Computer Science and Engineering (CSE):

- Overlap with existing (or planned) computing majors. In this respect, the Department does not have concerns. The proposed CGIS major complements the offerings for undergraduate students, but does not overlap with the Department's majors.
- Additional students in CS courses. In this respect, the Department is also supportive of the proposed major. We expect to be able to handle the extra students in the CS courses, as outlined in the proposal.

I note that the program faculty includes one CSE faculty member. This is helpful so that the CGIS major can be aware of and react to any changes in CS curricula. I hope this can be maintained.

I appreciate the chance to review the new major's proposal. The Computer Science and Engineering Department approves of the creation of the major.

Sincerely,

A handwritten signature in blue ink, appearing to read "Christian Shelton".

Christian Shelton
Professor & Department Chair
Computer Science & Engineering

6 January 2026

To Whom it May Concern:

The proposed new Cognitive and Information Sciences (CGIS) major, based upon the January 2026 draft proposal, is projected to enroll 150-300 students. From my reading of the proposal, a few students in the major may take upper division Math courses or courses such as Math 31, but the primary courseload would be due to each student being required to obtain credit for two quarters of freshman calculus (Math 7a, b or Math 9a, 9b) and Math 11.

Note that the admission into Math 7a, 9a requires placement, and an unprojected number of these students will be required to take Math 3, Math 6a, and Math 6b to qualify, which should also be factored into the projected demands on enrollment in Math courses. The Math Department would appreciate if such projections could be included in the proposal, and we are happy to coordinate with CHASS to assist in making such projections.

That said, I approve of up to 300 students from CHASS's new CGIS major enrolling in Math courses as described in the proposal.

Sincerely yours,

A handwritten signature in cursive script, reading "James P. Kelliher".

James Kelliher, Department Chair
& Professor of Mathematics



DEPARTMENT OF MOLECULAR, CELL, AND SYSTEMS BIOLOGY
RIVERSIDE, CALIFORNIA 92521-0146
OFFICE (951) 827-5427

March 31st, 2026

To: Peter Graham, Chair
Department of Philosophy

From: Michael E. Adams, Chair 
Department of Molecular, Cell and Systems Biology (MCSB)

Re: Proposed Cognitive and Information Science Major

MCSB faculty completed their review of the proposed Cognitive and Information Science undergraduate major. We are generally supportive of the cognitive science component of the proposal as it advances through the Academic Senate review process. However, as communicated earlier, faculty expressed concerns with regard to the information science component.

Our faculty concluded that the proposed major addresses a growing area of academic and professional interest. We anticipate that it will appeal to undergraduate students interested in human cognition and the social dimensions of technology. The program is highly interdisciplinary and aligns with contemporary research directions and career pathways.

MCSB expects to accommodate course loads for interested students from this major. Should enrollments grow to the extent that waitlist numbers become an issue, we may anticipate the need to prioritize our own majors (Neuroscience and CMDDB) or to offer new sections to meet the demand.

As part of our review by faculty members Connie Nugent and Anand Ray, we provided constructive feedback and suggestions for potential improvements directly to the program committee. This feedback primarily focused on curriculum design, including transparency of prerequisites and technical course content in the area of information science. Several of our faculty members commented that the proposed "Information Science" component of the major would benefit from a more technically robust curriculum to better align with the professional standards for systems and database management found in traditional Information Science programs and industry expectations. Additionally, there is a need to reconcile lower-division prerequisites with upper-division electives to ensure students have a clear and accessible pathway to completing their degree.

Please feel free to contact me if you require additional information or clarification regarding our department's position.



January 11, 2026

RE: Support for the Proposed Cognitive and Information Science Major

To Whom It May Concern:

As Chair of the Department of Philosophy, I am writing to express our strong support for the proposed undergraduate major in Cognitive and Information Science. We look forward to the way the interdisciplinary nature of the major will forge strong connections across departments on the campus and provide exciting opportunities for students as they choose to enroll in the new major. The Department of Philosophy will take on the administrative and leadership responsibilities for housing the new major, especially academic planning, academic events, and academic advising, with the support of the CHASS Dean's Office. We look forward to the first cohort of undergraduate majors.

Sincerely,

Michael Nelson

Michael Nelson
Associate Professor and Department Chair of
Philosophy at UC-Riverside
mnelson@ucr.edu



Tuppett M. Yates, PhD
Professor and Chair
Department of Psychology
900 University Avenue
Riverside, CA 92521-042
Tuppett@ucr.edu

TO: Dean Daryle Williams, CHASS

FROM: Tuppett M. Yates, Psychology Department Chair

DATE: December 19, 2025

RE: Support for a Psychology Track within the Proposed Cognitive and Information Sciences Major

Dear Dean Williams:

As Chair of the Department of Psychology, I am writing to express our strong support for the proposed undergraduate academic major, Cognitive and Information Sciences, to be administered by the Philosophy Department. Our department has voted to unanimously approve the inclusion of Psychology courses to fulfill the Psychology track requirements (37 eligible, 27 yes, 0 no, 1 abstain, 9 not available). We believe this major will provide a valuable pedagogical bridge between Philosophy and Psychology.

Thank you for considering this request.

A handwritten signature in black ink, appearing to read "Tuppett M. Yates". The signature is fluid and cursive, with a long, sweeping underline.

Tuppett M. Yates, PhD

September 26, 2025

To Whom It May Concern,

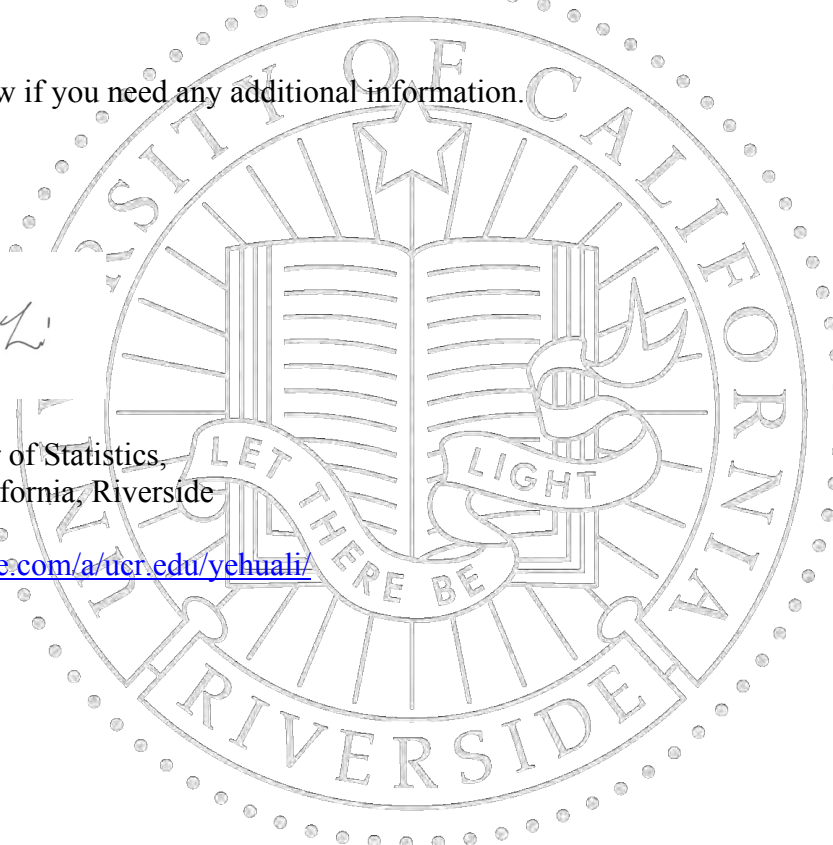
On behalf of the Department of Statistics, I am writing to express our strong support for the proposal to establish a new interdisciplinary major in Cognitive and Information Science. We recognize that several of our courses (STAT 004, STAT 010, STAT 108, STAT 156A, STAT 156B, STAT 160A) are included as core requirements and electives in the proposed major. Our faculty are supportive of this inclusion, and we believe we can accommodate the expected increase in student enrollment without compromising the quality of instruction. We believe this major will strengthen interdisciplinary research and teaching on campus and are enthusiastic about potential collaboration.

Please let me know if you need any additional information.

Sincerely yours,

A handwritten signature in cursive script that reads "Yehua Li".

Yehua Li
Professor & Chair of Statistics,
University of California, Riverside
yehuali@ucr.edu
<https://sites.google.com/a/ucr.edu/yehuali/>



Appendix F. Internal and External Letters of Support



College of Humanities, Arts, and
Social Sciences
EXECUTIVE COMMITTEE

May 27, 2026

TO: Peter Graham, Director
Cognitive and Information Science Program

FROM: Rachel Wu, Chair 
CHASS Executive Committee

RE: Proposal-CGIS B.S. in Cognitive and Information Science

The CHASS Executive Committee reviewed the Proposal-CGIS B.S. in Cognitive and Information Science. The committee agreed that this was a model proposal—impressive and diligent. They applauded the effort that the proposers made to engage with other colleges and programs on campus. The committee supports the new proposal.



Office of the Dean
900 University Avenue
3413 HMNSS Building
Riverside, CA 92521

August 31, 2026

Riverside Division of the Academic Senate
(via) Peter Graham, Distinguished Professor of Philosophy

Dear Colleagues:

On my final day as Dean of the College of Humanities, Arts, and Social Sciences, it is my pleasure to extend my endorsement for the proposed B.S. in Cognitive and Information Science (CGIS). This proposal represents a timely and vital addition to the academic offerings of our College and University.

While the study of artificial intelligence is already sprinkled throughout the CHASS curriculum, the need for this dedicated interdisciplinary program is clear. The proposal fosters robust collaboration between CHASS and other colleges, especially the College of Natural and Agricultural Sciences (CNAS) and the Marlan and Rosemary Bourns College of Engineering (BCOE). The formal and intentional blend of courses from computer science, philosophy, psychology, linguistics, and other disciplines equips students with a versatile skillset, preparing them to tackle a wide array of academic interests and career paths in post-baccalaureate training and employment in the public and private sectors. In short, CGIS promises to provide our students with the necessary intellectual and pre-professional tools for a world increasingly driven by AI, big data, and emergent technologies.

The proposal has already gone through the due diligence of the CHASS Faculty Executive Committee, who praised it as a "model." That said, we acknowledge that the ultimate approval and implementation of this program remain contingent upon several factors, including thorough review and approvals by the relevant committees of the Academic Senate, alignment with University of California Office of the President policies, and final administrative approval.

Furthermore, the allocation of necessary resources—including dedicated space, permanent instructional support, and funding for new faculty FTE and teaching assistantships—is yet to be determined. Without proper and intentional resourcing, this degree program will struggle to succeed. Thus, it shall be the responsibility of my successor, the Interim Dean, in collaboration with campus leadership and peer deans, to conduct a comprehensive resource assessment to

ensure the successful launch and long-term sustainability of the major. I have full confidence that incoming CHASS leadership will recognize the immense value of this program and work to secure the resources needed to bring it to full fruition.

Sincerely,

DocuSigned by:

Daryle Williams

DF581DF553974F3...

Daryle Williams
Professor and Dean

Cc: Steven Helfand, Interim Dean-designate
Covadonga Lamar Prieto, Associate Dean



Department of Psychology | 900 University Avenue | 1111 Psychology Building | Riverside, CA 92521

March 26, 2025

To whom it may concern,

I am writing to provide my enthusiastic support for an undergraduate major in Cognitive and Information Science (CIS) at the University of California, Riverside.

As a Cognitive Scientist by training—my undergraduate degree is in Cognitive Sciences from the University of California, Irvine—I am particularly swayed by the argument that our campus is the only one without a Cognitive Science major. The CIS proposal not only address this gap, it will further align the Cognitive Sciences field with Information Sciences. This union will help bridge Cognitive and Information Sciences to related majors, such as Computer Sciences and Statistics, which provide methodological foundations to the study and implementation of Artificial Intelligence and Big Data approaches.

The other compelling argument is that the CIS proposal will meet student interests and demand for training in these fields. I am currently the Area Head for the Cognition and Cognitive Neuroscience area within the Psychology Department at the University of California, Riverside. Our area includes core faculty in Cognition and Cognitive Neuroscience, but also affiliated faculty from all other areas in the department (Developmental Psychology, Social/Personality Psychology, Behavioral Neuroscience). We are the only area to do so, and the only one with graduate mentees electing to take our courses in spite of having mentors in other areas of study. This speaks to how central Cognitive Science is to a number of disciplines. Our faculty also co-mentor graduate students from a variety of other departments across campus, including Computer Science, Bioengineering, Neuroscience, and Genomics/Bioinformatics. The proposed undergraduate CIS major will not only strengthen these connections among areas and departments across campus, it will also build a pipeline for undergraduate students interested in these multidisciplinary fields that rely on a solid foundation in Cognitive and Information Sciences.

I look forward to supporting the CIS major at the University of California, Riverside.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ilana J. Bennett'.

Ilana J. Bennett

Principal Investigator | *Laboratory of Aging and Neurocognitive Imaging* | lanilab.ucr.edu

Associate Professor | *Department of Psychology* | psychology.ucr.edu

co-Director | *UCR Aging Initiative* | aging.ucr.edu

ilana.bennett@ucr.edu



**Department of Theatre, Film and
Digital Production**
900 University Avenue
Riverside, CA 92521

September 9, 2025

To: The UCR Academic Senate

RE: letter of support for the proposed new major in Cognitive and Information Science

Dear colleagues,

I write to express my support for the proposed new major in Cognitive and Information Sciences, which is both timely and impressive. The proposed new major brings together psychology, computer science, philosophy, among many other fields. This interdisciplinary approach is necessary for the major, which will allow students to explore the ways information is perceived, felt, synthesized and automated in our world. In the age of AI, as this new technology blazes into our realities, what could be timelier and more pressing than a major that fuses current technologies with attention to the philosophical and psychological implications?

As indicated by the proposers, UC Riverside remains the only UC campus with no Cognitive Science major or program, placing our students at a significant disadvantage. This new proposed major stands to rectify that situation and capitalize on our campus's stellar programs in philosophy, computer science and psychology. Furthermore, the potential to draw on additional subject expertise will enhance the already robust offering. A final compelling point that the proposers indicate is that UC Merced is the only other UC campus to have a combined Cognitive and Information Science major. Should UCR adopt this major, together with UCM, it would stand to make an impact also given our diverse student population.

Given all these factors, I recommend the adoption of this new important major at UCR.

Sincerely,

Erith Jaffe-Berg,
Department of Theatre, Film and Digital Production
University of California, Riverside
erithj@ucr.edu



DEPARTMENT OF PHYSICS AND ASTRONOMY
(951) 827-5331

RIVERSIDE, CA 92521-0413

September 12, 2025

Dear Senate Colleagues,

Artificial intelligence is rapidly transforming society, and its influence is evident in academia, including my own field of physics. In this context, the study of cognitive and information sciences has never been more relevant. As outlined in the proposal, the integration of perspectives from computer science, cognitive psychology, and philosophy offers valuable interdisciplinary insights into the evolving challenges and opportunities of artificial intelligence. I believe that students will find this program highly appealing, both intellectually and in terms of the diverse career pathways it may open. I was struck by the fact that UC Riverside is the only UC campus without a program in cognitive science, and I encourage the university to adopt this program to fill that gap.

Best,

A handwritten signature in black ink that reads "Ward Beyermann". The signature is written in a cursive, flowing style.

Ward Beyermann

September 24, 2025

Dear Colleagues,

I am writing in support of the proposed program on cognitive and information sciences developed by an interdisciplinary committee headed by Distinguished Professor Peter Graham in Philosophy.

I have reviewed the proposal and find it to be very well developed. It includes an appropriate mix of courses from the collaborating departments, one that will lead to a well-rounded treatment of both human thought and machine learning processes. It is, accordingly, an ambitious program. It will require students to be exposed to cognitive science in psychology, logic and theories of mind in philosophy, and information processing in computer science.

In an artful way, the program combines humanistic and scientific study, as well as theoretical and applied knowledge bases. Students should be able to use what they have learned in the program for future work as psychological researchers, information scientists, neurologists, educators, therapists, and librarians.

As the letters of support from colleagues off campus indicate, this is a program that exists on many research university campuses and one that has generated high levels of interest among undergraduate students, as well as fruitful exchanges among colleagues in collaborating fields.

I was initially concerned that the program would compete with work of cognitive scientists in the Department of Psychology. However, I have been assured by Prof. Graham that the cognitive scientists in Psychology are fully on board with the proposal.

Given that assurance, I am happy to offer my full and enthusiastic support for this exciting new program.

Sincerely,



Steven G. Brint
Distinguished Professor of Sociology



Dr. Jeanette Kohl
Co-Director, UCR Center for Ideas and Society
<https://ideasandsociety.ucr.edu>
Professor of Art History
<https://arthistory.ucr.edu/faculty/jeanette-kohl/jkohl@ucr.edu>

COGNITIVE & INFORMATION SCIENCE MAJOR (CGIS)

Letter of support

I enthusiastically support the draft that I have been presented for a new major in Cognitive and Information Science in the College of Arts, Humanities, and Social Sciences at UCR.

The Department of Philosophy is one of the most reputable in our college, and it is no surprise that the initiative for such an innovative new major comes out of this department. The proposed major in CGIS complements its existing major and minor in Philosophy and its major in Philosophy/Law and Society in an ideal way, situation the classical intellectual core discipline of philosophy at the center of current paradigm shifts in our societies. It is a timely proposal that builds on the academic strengths and the international reputation of various faculty members with interdisciplinary interests that reach beyond the borders of philosophical core fields (Graham, Nelson, Reck, Schwitzgebel).

It reacts to the need for more transdisciplinary intellectual training to make our students fit for the challenges of the future. In light of the rapid development of various forms of AI, big data, and new technologies – visual, textual, material – it shows in an exemplary way how the discipline of philosophy (the love of knowledge!), and with it the humanities, can and must take a lead in helping our students think through the complex developments of information technologies, now and in the future. To that end, broad transdisciplinary explorations are necessary.

As co-director of our UCR Humanities Center CIS, I have seen how keen students and faculty are to keep up with AI and how sincere their interest is in better understanding what exactly is

UNIVERSITY OF CALIFORNIA, RIVERSIDE



BERKELEY □ DAVIS □ IRVINE □ LOS ANGELES □ RIVERSIDE □ SAN DIEGO □ SAN

SANTA BARBARA □ SANTA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
RIVERSIDE, CALIFORNIA 92521-0304

From:

8th September 2025

Srikanth Krishnamurthy
Professor,
Dept. of Computer Science and
Engineering, University of California,
Riverside, Riverside, CA, 92521
Tel: 951-827-2348
E-Mail: krish@cs.ucr.edu
WWW: <http://www.cs.ucr.edu/~krish>

To Whom It May Concern:

To whom it may concern:

I write to express my whole hearted support for the new major in cognitive and information science being put together by Prof. Peter Graham and others. This major significantly transcends disciplinary boundaries to cover aspects that are not being covered at UCR today. It will be an excellent inter-disciplinary major that spans psychology, computer science, statistics and other disciplines. In particular, the space will have a huge impact on computer science research as well as education. In particular, computing is only as good as the cognition of the humans who develop the software and corresponding platforms. The usage of software tools also hinges on the cognitive abilities of the users; for example, in complex intrusion detection systems, a vital part of security today, defenders will need to have abilities to quickly and rapidly identify cues, and take proper actions. Similarly, how users interact with games will have to be well understood in order to incorporate design features that are engaging -- a key artifact of gaming industry. In my own research experience, we have tried to collaborate with faculty from other schools in cognitive science in pursuit of large grants; having faculty growth in this space will not only allow our students to expand their knowhow in this important space, but will also aid interdisciplinary research. I express my strong support and hope that Prof. Graham and his team's tremendous efforts in establishing this major are welcomed and appreciated.

Very truly yours,

A handwritten signature in black ink, appearing to read "Srikanth .V.K.", is written over the typed name.

Srikanth Krishnamurthy



Bourns College of Engineering
Department of Computer Science & Engineering
900 University Avenue
Riverside, CA 92521

September 10, 2024

To the UCR Senate:

I have been in contact for over a year now with Professor Peter Graham about the newly proposed major entitled "Cognitive & Information Science." I write in support of this proposal.

I serve as the Faculty Advisor for Computer Science as well as the Chair of the Undergraduate Committee, which oversees our undergraduate curriculum. In that role, I have some experience on program and course development for all of our majors (e.g., Computer Science, Computer Engineering, Data Science). However, in this letter, I am speaking purely personally on this matter and not as a representative of our department. Our chair will provide a letter separately for that purpose.

Since December of 2023, I have reviewed several drafts of the proposal, provided some guidance and suggested some corrections, which Dr. Graham has been dutifully incorporating as the proposal evolves in his discussions across campus. I also spoke with several of my colleagues about this proposed new major. Initially, I think there were some deeper concerns about the "Information Science" aspect of this program, which is intimately tied to Computer Science in many ways, and whether the proposed curriculum adequately met what colleagues felt required a robust foundation and advanced electives in data, information, computing, and analysis from a technical perspective. I strongly feel like those concerns were heard, and the program was adjusted accordingly.

Interdisciplinary computing is of vital importance. These types of majors should be encouraged. In total, I believe these may overtake CS in terms of overall enrollments as the discipline becomes ubiquitously woven into the fabric of all intellectual activity. Needless to say, AI is accelerating this trend and making it clear how computing affects all areas of inquiry. Some have likened CS to Math in that regard, ubiquitously vital, but CS (as evidenced by AI) may be even more so.

While there are a few minor outstanding corrections as of this writing, which I have no doubt Dr. Graham will be incorporating into the final draft, I am confident in saying that this new program should be a welcomed addition to the UCR catalog. I expect it will be a very popular new major.

Sincerely,

A handwritten signature in black ink that reads "Paea LePendur".

Paea LePendur, Ph.D.
Associate Professor of Teaching
Computer Science & Engineering
University of California, Riverside



Department of Psychology
900 University Avenue
Psychology Building
Riverside, CA 92521

4/2/2025

Dear Colleagues,

I am writing in enthusiastic support of the proposed Cognitive and Information Science (CIS) major at UCR. As a developmental cognitive scientist, I have seen how cognitive and information science is a highly interdisciplinary and timely area that requires the collaboration of many faculty from various departments. When I was an undergraduate at Carnegie Mellon University, the most exciting and popular degrees were interdisciplinary in nature, born from interdisciplinary collaborations, such as the proposed CIS degree. I believe the same is still the case now, that undergraduates at UCR would be excited to enroll in such a program, and would benefit greatly from what it would have to offer.

UCR is well-suited to provide this major, and students would be successful in the major and in life based on information and skills learned in the major, such as related to critical thinking. Importantly, the students likely will be well-placed for jobs after the degree, especially if there is an internship opportunity as part of the program. An interesting aspect of the interdisciplinary nature of the major is that it would bring together students from all kinds of backgrounds and encourage interactions and new creative research.

I fully support this endeavor and think the students and the university would greatly from this major.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rachel Wu'.

Rachel Wu

Associate Professor of Psychology

coming our way. Students have talked many times about how they would love to gain a deeper understanding of what the current computational paradigm shifts will mean for them and their careers, for our societies, and for the future of humanity. As PI of the “Being Human” Initiative at the CIS I have advocated for a more coordinated cross-disciplinary education that situates the Humanities disciplines, their hermeneutic understanding of the world, and their differentiated methodological tools of critical thinking at the heart of any cross- and interdisciplinary training of our students. Philosophy is an ideal place for that.

The combination of courses from psychology, computer science, philosophy, linguistics, neuroscience, and mathematics is both bold and it makes sense. Who we are (mind, soul, intellect, body), how we think, what thinking even IS, how it changes and can be manipulated, and how it is related to perception, language, and ‘feeling’ are among the most vexing questions of mankind. I find it utterly encouraging to see that this new major takes that ball and runs with it, from traditional historical training straight into the future!

As a scholar of the Italian Renaissance, a time when the sciences, the arts, theology, and philosophy were understood as a unity, I am aware of the innovative power that such thinking across ‘disciplines’ has produced historically – and will continue to produce. It will be great to see our students be trained broadly in and outside of CHASS, in a well-coordinated major.

The scope of courses presented in the proposal is impressive; it forms a realistic picture of the possibilities that such a major can offer. It is modelled, so it seems, after two successful programs at Merced and Occidental. The core faculty involved in the new CGIS major are dedicated teachers and innovative thinkers (I have the pleasure of knowing all of those in Philosophy, to varying degrees). The reach into disciplines outside of CHASS – Cell Biology / Neuroscience, Mathematics, and Computer Science – is well-argued and makes sense. This cutting-edge major will visibly enhance UCR’s portfolio of undergraduate programs and majors. It can also be expected that an academic degree in CGIS will increase career chances on the rapidly developing job market and open doors for a wide range of graduate programs.

This proposal is intellectually exciting, academically forward looking, and carefully thought through. It convinces, and it has my full endorsement.

Jeanette Kohl

A handwritten signature in black ink, appearing to read "J. Kohl", with a long, sweeping horizontal stroke extending to the right.



Letter in support of the new major on cognitive and information science at UCR

To whom it may concern,

Bence Nanay
 Professor of Philosophy and BOF Research Professor (ZAPBOF)
 Centre for Philosophical Psychology
 University of Antwerp
 D 413, Grote Kauwenberg 18,
 2000 Antwerp, Belgium
 Tel: +32 32654340
Bencenanay.com
Bence.nanay@uantwerpen.be

November 12, 2023.

I am writing in strong support of establishing a new major on cognitive and information science at the University of California, Riverside. Given the strengths of the faculty in various disciplines, but especially in philosophy at UCR, establishing such a program would be beneficial for everyone involved, the undergraduates, the graduate students in all the departments involved and in the research community in general. Having been involved in a number of cognitive science (or similar) programs – at UC Berkeley as a grad student, at Syracuse University and University of British Columbia as a junior faculty member and at Cambridge University and University of Antwerp as a senior academic, as well as the director of the European Network for Sensory Research (a network bringing together philosophers, psychologists and neuroscientists from a variety of European countries), I see huge potential in a new major on cognitive and information science at UCR, especially with the recent



THE UNIVERSITY *of* EDINBURGH

8 December 2023

Dr. MARK SPREVAK

SENIOR LECTURER

SCHOOL of PHILOSOPHY, PSYCHOLOGY *and* LANGUAGE SCIENCES

The University of Edinburgh

Dugald Stewart Building

3 Charles Street

Edinburgh EH8 9AD

Telephone +44 (0)131 650 3960

Email mark.sprevak@ed.ac.uk

URL <https://marksprevak.com/>

External evaluation of Cognitive and Information Science Major

I am writing in support of the Cognitive and Information Science Major at UC Riverside proposed by Professor Graham in collaboration with Professor Nelson and Professor Schwitzgebel.

I am Associate Professor in Philosophy at University of Edinburgh. I am currently the Programme Director for the taught MSc postgraduate programme in Mind, Language and Embodied Cognition at University of Edinburgh (<https://www.ed.ac.uk/c/mlec-pg-online-info>). This 1-year programme accepts approximately 20 students each year and trains them in cognitive science. Once graduated, many of our students join top-ranked PhD programmes in UK, Europe, US, Canada. In recent years, I have also been the Teaching Director for our undergraduate Cognitive Science (MA) degree programme (<https://tinyurl.com/37u3pm5t>). This 4-year programme accepts approximately 100 students. Similar to the proposed major at UC Riverside, students on this degree programme learn by taking courses from a variety of different subject areas and learn about how cognition, perception, and action works from an interdisciplinary perspective. The courses they receive are taught by faculty based in philosophy, psychology, linguistics, mathematics, and computer science.

Across my 10 years at Edinburgh, I have seen many students graduate both these degree programmes. I have taught classes on both programmes (on philosophy of psychology, embodied cognition, ethics of AI, programming, data science). I have witnessed graduates from these programmes go on to impressive careers in academia, industry, and the public sector. I have been impressed by the extremely high degree of intellectual satisfaction these students report they have obtained from their academic studies. The students remain curious, interested, and passionate about the topics they studied long after they graduated. They report that their studies have informed areas of their future lives in all manner of surprising and important ways.

The proposed major at UC Riverside – similar to the programmes on which I have taught – will train students in cognitive and information science by combining materials from philosophy, psychology, linguistics, neuroscience, computer science, and mathematics. I can only say that from my own experience this is an incredibly worthwhile endeavour. UC Riverside has huge depth and breadth of research and teaching

expertise to offer in each of these subject areas. The proposed major is an ideal way to combine these existing strengths and capitalise on them. The result would be, in my view, a net pedagogical and strategic gain for the institution, and for relatively modest administrative cost.

Cognitive science and interdisciplinary approach to the mind are increasingly important in both academia and the wider world. When allied to work in computer science and artificial intelligence – as specifically proposed by the major – they represent a vital set of skills and knowledge for citizens of twenty-first century societies. Understanding the mind requires expertise from a variety of specialist areas. Such work also notably forms an important meeting place between the sciences and the humanities. Consideration of ethical questions, for example, is central to understanding the role of human cognition and its relationship to technology like AI. Scientific empirical and formal work need to make meaningful contact with what have traditionally been perceived to be humanistic concerns about the role of cognition in the wider world. The skills that students would acquire through such a major would help to prepare them for a wide range of careers; it would not only help them to participate in developing future technology, but it would also to understand how that technology might interact with human minds and how it should be used and regulated. Finally, a key feature of work in this area is that breakthroughs in this domain often come fast and in surprising places. It is not unusual for a researcher who is early in their career, or even a student, to make significant discoveries. Our students found this opportunity particularly exciting and it led to some productive interactions between research and teaching.

In my view, the proposal for a Cognitive and Information Science Major at UC Riverside makes a compelling case: it is well thought out, it addresses a timely and pressing societal need, it astutely leverages existing resources and areas of strength in UC Riverside, and it has the potential for large strategic and pedagogical gain for the institution. I have no reservations about the proposal. In my view, it would be strongly in the university's interests to implement it.

Please do not hesitate to contact me for any further information.

with best wishes,

A handwritten signature in black ink, appearing to read 'msprevak', followed by a period.

Dr. Mark Sprevak



Dr Giacomo Melis
UKRI Future Leader Fellow

A76 Pathfoot Building
University of Stirling
Stirling
FK9 4LA
Tel: +44 (0)1786 467564
giacomo.melis1@stir.ac.uk

15 November 2023

Dear UC Riverside Senate,

I write in strong support of the proposal for a Major in Cognitive and Information Science at UC Riverside.

I am a philosopher who is leading an interdisciplinary research project involving developmental psychology and comparative cognition, which is supported by a grant of over £ 1M by UKRI, and it is taking place at the Universities of Stirling and Vienna (for details, see: <http://ared.stir.ac.uk>). UKRI is a British non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy, and it brings together the seven disciplinary research councils, Research England and the UK's innovation agency, Innovate UK. (For more, see <https://www.ukri.org/about-us/who-we-are/>). I am also a member of the UKRI Talent Peer Review College.

In virtue of my relationship with UKRI, I am aware of the growing importance of interdisciplinary research in academia and innovation. As a philosopher who is engaging directly in it, I also know the enormous potential for philosophy to contribute to interdisciplinary research. However, it is still relatively rare to find philosophers who are willing to engage with it. This is partly due to the fact that philosophers' training seldom encourages engagement with other disciplines. The proposed Major in Cognitive and Information Science at UC Riverside, with its strong emphasis on the theoretical foundations of cognition and information, promises to make a difference in this respect. Many future graduates of the program will have the philosophical expertise and the familiarity with other disciplines to start new interdisciplinary research in the study of the mind, cognition, knowledge, and related fields. The proposed Major thus will be important to keep UC Riverside at the cutting edge of the formation of researchers and innovators of the future and thereby enhance the prestige of the institution.

Please feel free to contact me with any questions you may have regarding this recommendation.

Your sincerely,

Giacomo Melis



November 25, 2023

Dear Colleagues,

I am writing you to say that I strongly support the proposal to establish a Major in Cognitive and Information Science at UC Riverside. Let me explain why.

Prior to my arrival at Indiana University in 2002, I had never studied or taught at university that had a cognitive science program—or even any way a student could major in cognitive science. So, when I received an invitation from Andy Clarke to attend his first beginning-of-the-academic-year party as Director of IU's Cognitive Science Program, I thought of it, not just as an occasion to meet some of my new colleagues, but also as an occasion to engage in a bit of cultural anthropology. I wondered what difference it would make, to my experience as a member of a philosophy department, that I was now going to be working in a university that has such a program.

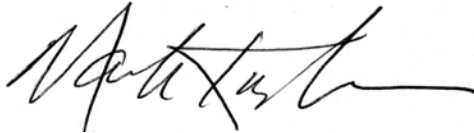
What happened at the party made the answer very clear. That people were eager to meet me was no surprise. Word had gotten out that I had just been chosen to be the next chair of the philosophy department. But what floored me was the pattern that, in every instance, my interaction with the people I met took. No one wanted to engage in small talk. No one wanted to know where I had come from, or about how I was settling in. All they wanted was (i) to have me tell them what I was working on, (ii) to tell me in turn what *they* were working on, and (iii), if there turned out to be even the slightest possibility that there was some connection between our projects, to set a time to have coffee and see if we might be able to collaborate.

This enthusiasm for collaboration—this eagerness to find ways in which traditional approaches to the study of mind and its search for knowledge might enrich, and be enriched by, the newest developments in computer, brain, robotic, computational and information sciences—has proved to be infectious. One conspicuous result is a significant population of undergraduates majoring and minoring in cognitive science who are comfortably bridging without a second thought what used to be (and was much lamented for being) a yawning chasm between humanistic and scientific ways of understanding the world and our place in it. Another conspicuous result is the advantage we get to enjoy when recruiting new faculty. If there is anything I have learned from the many philosophy department searches in which I have been involved at IU, it is this: IU's commitment to cognitive science is extremely attractive to prospective faculty hires.

So, my message is this. I have lived the life of a philosopher in a university that has no avenue for a student to pursue cognitive science. And I have lived the life of a philosopher in a university that *does* have such an avenue. I know the difference between them. And that is why I can say with complete confidence that creating a

major in cognitive and information sciences would be a major boon to UC Riverside—and why I am happy to give the proposal before you, a proposal to create such a major, my complete support.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Mark Kaplan', with a stylized, flowing script.

Mark Kaplan
Professor Emeritus
Department of Philosophy
Indiana University
Bloomington

November 16, 2023

Faculty Senate
University of California, Riverside

Re: Proposal for major in Cognitive Science

Dear Senate Members,

I write to strongly support the proposal for an undergraduate major in cognitive and information science at the University of California, Riverside. At present, I am an assistant professor in the philosophy department at Northwestern University. I am also an affiliate faculty member with, and a member of the program committee for, the cognitive science department here in Evanston. I earned my PhD in philosophy from Rutgers University, New Brunswick where I was also a member of Rutgers Center for Cognitive Science (RuCCS). In writing to support the proposal, I write as someone who has, and continues to, benefit from involvement with cognitive science.

Cognitive science is an established, interdisciplinary field. It has its own international societies, such as the Cognitive Science Society, and there are numerous journals dedicated to its characteristically interdisciplinary approach to questions about the mind, computation, and the like. Those journals include *Behavioral and Brain Sciences*, *Cognition*, *Cognitive Science*, and *Trends in Cognitive Science*.

I am confident that a major in cognitive and information science will richly contribute to the academic life at Riverside in numerous ways. I highlight a few below.

- *Meeting student interest.* Cognitive science is a steadily growing major. The National Center for Education Statistics notes that from 2012 to 2020 the major grew from 696 students nationally to 2,720. At Northwestern, we have recently seen even more explosive growth. In Fall 2020, our department had 71 declared majors. As of Fall 2023, we now have 161 majors.
- *Cultivating interdisciplinarity.* Cognitive science offers a unique way to train students to think across disciplines. Different disciplines have different ways of seeing the world. Without encouragement, students can be limited to the methods and priorities of one discipline. But by encouraging students to take courses across different disciplines, cognitive science encourages students to cultivate an interdisciplinary approach to research that is otherwise difficult to cultivate from within only one discipline.

- *Recruiting faculty.* The ability to be involved with a cognitive science department is a perk for many faculty with primary affiliations in other departments (e.g. philosophy, linguistics, psychology). This perk enhances the ability of these home departments to recruit faculty. For example, I left another institution for Northwestern, in part, because of a desire to teach and conduct research within the interdisciplinary environment provided by involvement with cognitive science.

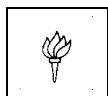
The proposal details an excellent major. The sample program of study detailed in Appendix C, for example, resembles the program of study for cognitive science on the quarter system here at Northwestern. The ability to create a major that is a cognitive *and* information science is a notable opportunity too. When many cognitive science programs emerged in the middle to the latter half of the 20th century, they did not have a focus on information studies. Such a focus is now very timely, and it is exciting for Riverside to be able to integrate cognitive and informative science into one major for its undergraduates.

Altogether, the opportunity to add a major in cognitive and information science is a slam dunk. It is excellent for the students, it is excellent for the faculty, and it is excellent for the contributing departments. After you have added this major and seen what it provides, I am confident that your only regret will be that you didn't create it sooner.

Best regards,

A handwritten signature in black ink that reads "Peter van Elswyk". The signature is fluid and cursive, with the first name "Peter" and last name "Elswyk" clearly legible.

Dr. Peter van Elswyk
Assistant Professor, Philosophy
Program Committee, Cognitive Science



New York University

Department of Philosophy
5 Washington Place
New York, NY 10003-6611
Telephone: (212) 998-8320
FAX: (212) 995-4179

November 13, 2023

Dear colleagues,

I write regarding the proposal for a major program in Cognitive and Information Sciences at UC Riverside. The cognitive and information sciences are among the most active areas in science inside and outside academia. Recent progress in artificial intelligence makes understanding cognition and information in human and artificial minds more urgent than ever. UC Riverside is well-placed to run a program in this area, with many experts in the relevant fields. I strongly support the proposal.

I am myself a product of a program in cognitive science. At Indiana, I received a joint Ph.D. in philosophy and cognitive science, which gave me a valuable training in the multidisciplinary areas (especially psychology, neuroscience, computer science) that have been central in my subsequent career. I wish I could have had undergraduate training in such a program as well. I've been part of similar multidisciplinary centers and programs at Washington University, UC Santa Cruz, Arizona, and NYU. I've seen how beneficial they can be for students, and how much demand there is from students when these programs exist. I look forward to seeing the UC Riverside program in Cognitive and Information Sciences become a similar success.

Sincerely,

David Chalmers

University Professor of Philosophy
Co-Director, NYU Center for Mind, Brain, and Consciousness



UNIVERSITY OF PENNSYLVANIA
PHILADELPHIA, PENNSYLVANIA 19104

Charles Yang
University of Pennsylvania
3401 Walnut Street 315C
215-898-5478

November 17, 2023

Dear colleagues:

I am writing in support the effort at UC Riverside to develop an undergraduate program in Cognitive Science.

I am the Director of Cognitive Science at the University of Pennsylvania. Cognitive Science has had a long tradition at Penn, which can be viewed as one of its birthing places. In the late 1940s and 1950s, researchers from a number of disciplines including the burgeoning field of computer science (e.g., ENIAC) started applying formal and mechanical methods to the study of the mind and behavior, a consequence being the development of generative linguistics by Noam Chomsky, a graduate student here at the time. Penn established a major in the late 1980s when the interdisciplinary approach in cognitive science was still being developed. It is now safe to say that the kind of interdisciplinary training and research has become mainstream, not only in cognitive science but in many other disciplines. Over the years, student interest in cognitive science has grown tremendously: at this moment, Cognitive Science is one of the top ten largest majors at Penn. This development in part has to do with the widely recognized utility – and marketability – of computational and quantitative skills, both of which are central to cognitive science. The development of AI technology and its social and ethical implications have given rise to the need for a proper understanding of human cognitive capacities.

Cognitive Science is important for preparing students for the modern world. With the excellent faculty at Riverside, I am confident that the Cognitive Science program under development will be a success, and I encourage the administration to provide the necessary support to ensure that success.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles Yang".

Charles Yang

Professor of Linguistics, Computer and Information Science, and Psychology
Director, Program in Cognitive Science



Department of Philosophy
1879 Hall
Princeton, New Jersey 08544-1006
USA
+1-609-258-4289

DR. GRACE HELTON
Assistant Professor
work +1-609-25-4311
fax +1-609-258-1502
ghelton@princeton.edu
www.gracehelton.net

University of California, Riverside
900 University Avenue
Riverside, CA 92521

20 November 2023

To Whom It May Concern:

I am writing in favor of the proposal to create a B.S. in Cognitive and Information Science at UC-Riverside. I am an external scholar, currently employed as an Assistant Professor in the Philosophy Department at Princeton University, where I am also affiliated with the Cognitive Science Program. Much of my own research spans topics in philosophy and cognitive psychology. In addition, all of the undergraduate courses I teach at Princeton are cross-listed in both the Philosophy Department and the Cognitive Science Program. I also served during the 2019-20 academic year on a committee designed to reinvigorate the Cognitive Science Program at Princeton. So, my research is in cognitive science, and I also have practical experience with the benefits and challenges of implementing a cognitive science program in the university setting.

The proposal to create a new major in Cognitive and Information Science would give UC-Riverside undergraduates a new path to exploring questions of psychology and information-processing through the many empirical and theoretical disciplines which feed into these questions. These disciplines include but are not limited to: computer science, philosophy, psychology, and statistics. One rationale for this broadly interdisciplinary approach is that the study of human minds, animal minds, and AI might be helped by considering these kinds of minds or information-processing systems together, in comparison with each other. For instance, the way a vervet monkey, a human infant, and ChatGPT convey and receive information is different in some ways but similar in others. Making comparisons across biological and artificial minds might lead to a better understanding of the distinctive aspects of each of these minds and might also shed light on the dynamics that can emerge when these kinds of minds interact.

Another rationale for the broadly interdisciplinary approach is that minds—whether human, animal, or artificial—are implemented at several levels and via different kinds of physical realizers. At a minimum, a mind or information-processing system involves high-level activities implemented by simpler sub-tasks. In biological minds, these hierarchical activities are physically realized by brains and thus are implemented by neural processes. In artificial information-processing systems, these hierarchical activities are implemented by digital programs run on hardware. So, due to both the complex nature of mental activities and the diverse physical underpinnings of these activities, it is appropriate for students interested in the mind to draw on the range of disciplines represented in the proposal, such as psychology, neuroscience, philosophy, and computer science. Each of these fields can help illuminate some aspect of minds and information-processing systems, and it is only in studying these fields together that students can get a full picture of the issues.

The proposal for the new major is well-designed to give students a broad and foundational training in the major issues in cognitive science. The major would draw on fields as diverse as: philosophy, psychology, linguistics,

computer science, statistics, and cell biology and neuroscience. At the same time, the proposal includes the development of some new courses for majors, such as CIS 001 *Introduction to Cognitive Science* and CIS 100 *Cognition, Computation, and Information*, which will give students an opportunity to synthesize what they learn in other courses and ensure that students have a shared foundational training. Moreover, by housing the program in the Philosophy Department and pairing the program with several new philosophy classes focused on cognitive science, such as *Philosophy and Artificial Intelligence* and *Philosophy of Information*, the proposal ensures that there will be a kind of continuity for majors. Housing the program in the Philosophy Department also makes good use of the department's special research strengths in action theory, philosophy of mind, theory of knowledge, and philosophy of language.

As mentioned in the proposal, creating this major at UC-Riverside would have several benefits. First, the program would permit students to understand the rapidly emerging field of AI. Since AI is poised to deeply shape nearly all aspects of human culture, this kind of study prepares UC-Riverside students to go on to influence AI policy and development in an informed way. Relatedly, careers in AI are already on the rise, and this major would help UC-Riverside students link their academic training to real-world needs in a direct way.

Second, the program will help counter the common tendency in the university towards academic hyper-specialization, wherein departments train students in their own, narrowly conceived methods and questions, without much input or consideration for methods or questions from other fields. For instance, one of the proposed new courses for the major, *Introduction to Cognitive Science*, will likely cover a very wide range of topics across fields, including cognitive psychology, philosophy, computer science, and even (perhaps) child development, ethology, or other fields. For several years now, I have taught a similar introductory cognitive science course at Princeton, and I have found that the course expands students' interests in a helpful way. The course helps those students more drawn to STEM approaches to explore questions of psychology from a more humanistic perspective. The course also helps those students more drawn to the humanities to look at empirical data and address questions of psychology through the methods of science.

Beyond the many benefits to undergraduates, I also think the new B.S. in Cognitive and Information Science will benefit faculty's research. At least, in my own experience, teaching courses cross-listed in cognitive science has pushed me far outside my main research areas. As mentioned, my primary research is already interdisciplinary, drawing heavily on both philosophy and cognitive psychology. In the context of teaching and developing various undergraduate courses in Cognitive Science, I have reached beyond those fields to teach sessions on linguistics, evolutionary biology, AI ethics, and animal behavior. I think these experiences have broadened my approach to my own research questions in a helpful way.

I hope to have given some sense of how I think a new major in Cognitive and Information Science will benefit UC-Riverside students and the university more generally. I am enthusiastically in favor of this proposal, as I think it would be an outstanding addition to the university curriculum. Please do not hesitate to contact me with further questions.

Sincerely,



Dr. Grace Helton

December 5th, 2023



RICE UNIVERSITY

Cognitive Sciences

To: Academic Senate
University of California, Riverside

From: Bartlett D. Moore IV
Director, Cognitive Sciences Program
Rice University

To the Members of the Academic Senate,

I am writing to provide a letter of support for the proposed Cognitive and Information Science (CIS) major program at UC Riverside. Cognitive Science as a school of thought gravitates towards questions and explanations of how intelligence can be understood through the lens of *information acquisition, representation, and transformation*. It also serves as a framework, integrating contributions from Philosophy, Psychology, Neuroscience, Computer Science, Linguistics, and Anthropology. It is advantageous, therefore, to combine the merits of Cognitive and Information Sciences into a single coherent academic program. This is particularly the case given the resurgence of applied artificial intelligence, and the blossoming field of data science.

I have reviewed the CIS program proposal, and it appears to successfully integrate the merits of both Cognitive and Information Sciences, and in that sense could serve to not only bring UCR to parity with peer institutions but propel it to the front. Here at Rice University, the undergraduate Cognitive Sciences program has doubled in enrollment over the past 10 years. Meanwhile, Rice University has developed a Data Science program that is likewise popular. If the success of similar programs at Rice and other peer institutions is any indication, it is highly likely that CIS will be an attractive and popular program among UCR students. Furthermore, any endorsement and support that the UC Riverside administration can invest in the program will yield high returns in the coming years.

In summary, the plan proposed by Dr. Graham and his colleagues is be inspired and timely. I have no outstanding concerns about the implementational details. UC Riverside would be well served by the program and as such I endorse it strongly.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bartlett D. Moore'.

Dr. Bart Moore IV, PhD
Director, Rice University Cognitive Sciences program



DEPARTMENT OF PHILOSOPHY
STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-2155

John Perry
Department of Philosophy
Email: john@csli.stanford.edu

November 21, 2023

Peter J. Graham
Professor of Philosophy and Linguistics
University of California, Riverside

Dear Peter:

A major in Cognitive and Information Science is a great idea for UCR, and indeed for any UC campus. We instituted Symbolic Systems at Stanford quite a while ago, because we realize that there was a cohort of very bright students with interest in logic and computer science, together with an interest in some of the humanities and social sciences where these disciplines are used, like psychology, linguistics and philosophy. Symbolic Systems majors don't need to take course in Ancient Philosophy and not much in ethics, and can concentrate on the more theoretical parts of linguistics and psychology. They can get enough computer science and logic to be very employable.

This major has been very successful. From the point of view of linguistics, psychology and philosophy, very bright students are introduced to these fields that might not have been otherwise. The major has proven very valuable to many of the students in terms of careers. Paypal, Linked-In, and a number of other thriving companies were founded by symbolic systems majors, and they have played a big



DEPARTMENT OF PHILOSOPHY
STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-2155

role in a number of other companies. The exposure to several disciplines has helped many to make very good decisions about graduate school.

After teaching at UCR, I taught half-time at Berkeley for a couple of years. I had the sense they could use something like a symbolic systems major. Maybe an anecdote makes the case best. I was teaching a philosophy of language course with about fifty students. One day, for reasons I can't remember, I mentioned that I was one of the organizers of Symbolic Systems at Stanford. A student leaped to his feet and said "Oh my God, that is the greatest major there is anywhere! Why can't we have something like that at Berkeley!" Turns out they already had one. Who knew? Glad to hear that UCR will soon have one too.

So, I think your new major is a very good idea!!

Sincerely.

A handwritten signature in black ink that reads "John Perry". The signature is written in a cursive, flowing style.

John Perry
Professor Emeritus, Stanford and UC Riverside

Dr Giacomo Melis
UKRI Future Leader Fellow

A76 Pathfoot Building
University of Stirling
Stirling
FK9 4LA
Tel: +44 (0)1786 467564
giacomo.melis1@stir.ac.uk

1 April 2026

Dear UC Riverside Senate,

I write in strong support of the proposal for a Major in Cognitive and Information Science at UC Riverside.

I am a philosopher who is leading an interdisciplinary research project involving developmental psychology and comparative cognition, which is supported by a grant of over £ 1M by UKRI, and it is taking place at the Universities of Stirling and Vienna (for details, see: <http://ared.stir.ac.uk>). UKRI is a British non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy, and it brings together the seven disciplinary research councils, Research England and the UK's innovation agency, Innovate UK. (For more, see <https://www.ukri.org/about-us/who-we-are/>). I am also a member of the UKRI Talent Peer Review College.

In virtue of my relationship with UKRI, I am aware of the growing importance of interdisciplinary research in academia and innovation. As a philosopher who is engaging directly in it, I also know the enormous potential for philosophy to contribute to interdisciplinary research. However, it is still relatively rare to find philosophers who are willing to engage with it. This is partly due to the fact that philosophers' training seldom encourages engagement with other disciplines. The proposed Major in Cognitive and Information Science at UC Riverside, with its strong emphasis on the theoretical foundations of cognition and information, promises to make a difference in this respect. Many future graduates of the program will have the philosophical expertise and the familiarity with other disciplines to start new interdisciplinary research in the study of the mind, cognition, knowledge, and related fields. The proposed Major thus will be important to keep UC Riverside at the cutting edge of the formation of researchers and innovators of the future and thereby enhance the prestige of the institution.

Please feel free to contact me with any questions you may have regarding this recommendation.

Your sincerely,



Giacomo Melis



Nov 14, 2023

Dear Colleagues,

I am writing in extremely strong (indeed, quite vociferous) support of the proposal to start a new major in Cognitive and Information Science at UCR. For context, I am currently Professor of Cognitive Philosophy at the University of Sussex, with joint appointments in Informatics and Philosophy. Prior to that I was Director of MLEC (Mind, Language, and Embodied Cognition) at the University of Edinburgh. I have also been Director of the Cognitive Sciences program at Bloomington, Indiana, and Director of the Philosophy – Neuroscience- Psychology (PNP) program at Washington University in St Louis. These roles meant I have spent much of my academic career either starting or nurturing programs in cognitive science and cognitive studies.

Regarding the proposed new major I was, to be honest, surprised to hear that UCR did not already run a course in this broad ballpark. There was a time when such programs existed only in a few unusually exploratory and interdisciplinary settings (UCSD, Edinburgh, Sussex, to name perhaps the most well-known). That phase was followed by a wider roll-out, as neuroscience made sufficient systemic strides to create new synergies with AI and Psychology. Fast forward to the present and we find many of our new undergraduates in arts, sciences, and humanities simply taking for granted the presence on campus of some kind of integrated program spanning philosophy and the sciences of the mind – so that it is no longer necessary to explain what such a course studies, in the way it was even 10 or 15 years previously.

Nonetheless, the last 10 years has seen another major shift – a shift towards giving increased prominence to Information Science, broadly construed. This is partly because information and formalizations of information change and flow are pretty

clearly the common denominator holding together the various sciences of mind. But there are other forces at work too. In a world transformed by rapid increases in computing power, deep learning, and the rise of big data, it feels increasingly vital to teach students about the fundamentals of Information Science. Students are truly keen to learn what lies beneath the hype, what has actually been achieved, and what the future might hold. There is also a solid recognition of the increasing hybridization of human thought, as we learn new ways to cooperate with these fundamentally alien intelligences. All this gives new life to old questions about the nature of human perception, of ‘real’ understanding, and our contact with reality.

A major that allows students to become better informed about such matters will be popular and timely. It will also have knock-on effects on other disciplines and on student life in general, promoting more informed discussion and helping to build new bridges. But above all, it will matter – it will matter practically, theoretically, and ethically. Indeed, I think that equipping students to really get to grips with these issues is one of the most important goods (in both the practical and the value-sense of ‘good’) that a contemporary education should deliver.

Sincerely,



Andy Clark FBA, FRSE
Professor of Cognitive Philosophy
Dept. of Philosophy, and Dept. of Informatics
University of Sussex, UK



DEPARTMENT OF PHILOSOPHY

2210 Speedway, WAG316 · C3500 · Austin, TX 78712 · 512-471-4857 · FAX 512-471-4806
<https://liberalarts.utexas.edu/philosophy>

4 December 2023

To Whom it May Concern,

This is an external letter of support for the prospective new major, to be hosted in the Department of Philosophy at UC Riverside, in Cognitive and Information Science. I've read the current draft proposal and I can say that it seems to me an excellent idea, well-conceived and very likely to be highly successful.

The remarkable proliferation of AI technologies and the growing role of "Big Data" create an opportunity for an academic degree program that focuses on issues and questions that arise in that context. The current proposal is extremely sensible and well-crafted toward that end.

Another virtue of this sort of interdisciplinary proposal is the bonds it creates across departments (and sometimes even across divisions within a college): as issues and questions arise and then are conceived and reconceived in both humanistic and scientific terms, new perspectives and synergies will naturally emerge. And that the major be housed in the Philosophy Department also makes sense, as Philosophy can serve as a crucial disciplinary fulcrum for the sort of issues that will arise across the other units involved. (Cognitive Science majors are in fact often hosted in Philosophy Departments.) From my perspective, this looks like the sort of organically arising and broadly established sort of interdisciplinary major that one can be most confident of, with elevated chances of success.

Of course a new program can hardly be incubated without some impact on current resources. But this proposal has a relatively small initial footprint (in terms of faculty and staff personnel, and space and technology): and indeed the benefits to be garnered are likely very quickly to make the program a net producer rather than a consumer of University resources.

The innovation of strong and popular undergraduate programs, with excellent academic *bona fides*, is an important part of a successful academy like UC Riverside; I think the proposed Cognitive and Information Science program would be an excellent enhancement, accordingly.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "E. Sosa".

David Sosa
Temple Centennial Professor in the Humanities, and
Chair, Department of Philosophy

UNIVERSITY OF CALIFORNIA, BERKELEY

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SANTA BARBARA • SANTA CRUZ

Professor Alva Noë
DEPARTMENT OF PHILOSOPHY
BERKELEY, CALIFORNIA 94720-2390
TEL: 510-642-2722
FAX: 510-642-4164
EMAIL: noe@berkeley.edu

14 November 2023

Dear Colleagues,

I am writing warmly to endorse the proposal to create a new major at UC Riverside in Cognitive and Information Science. Here at Berkeley I am Professor of Philosophy, and Chair, and also a member of the Institute for Cognitive and Brain Sciences; I am also an affiliated faculty member of the Berkeley Cognitive Science Major. In addition, I participated, quite some time ago now, in meetings at the then brand new UC Merced, to support them in the design and establishment of their programs and majors in this area.

Here are some reasons why I would support a new CIS major at UC Riverside. First, this is a lively area of knowledge growth. Second, because of the explosion of new work in AI, but also in robotics, and data science, cognitive science – which comprises the study of all of this – is poised to be a vital field. Third, here at Berkeley this is a very popular major. Fourth, because of its interdisciplinary nature, CIS would tend, I think, to enhance existing programs rather than siphon students away from them. That's our experience here in Philosophy at Berkeley. Our courses that meet CS requirements are very well subscribed and this is a real boon. Fifth, and last, UC Riverside students deserve and need to have this educational path open to them.

I do have one caveat. Cognitive science, because of its interdisciplinary nature, is a little betwixt and between. On the one hand, it is an interdisciplinary field. Its practitioners tend to include people working in philosophy, computer science, linguistics, psychology, math, engineering, neuroscience, etc. On the other hand, it has tended, over the last half century or so, to consolidate itself as its own field, with its own methods, practices, journals, and departments.

Here's the caveat: a good cognitive science program needs good advising so that students can be mindful of the the pros and cons in choosing to major in CIS rather than in one of its disciplinary kin.

But this concern is no reason to pass on this important opportunity to catch up to developments happening on campuses around the world.

I am strongly in support of this very well-thought-out move to found a new major in Cognitive and Information Science at UC Riverside.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Al (..".

Alva Noë
Professor of Philosophy, and Chair

December 11, 2023

Dear Colleagues

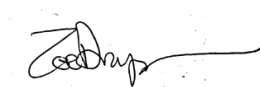
Proposal for Cognitive & Information Science Major, UC Riverside

I am writing to give my support to the UC Riverside Philosophy Department's proposed new major in Cognitive & Information Science.

I am Director of Cognitive Science at UC Davis, where I am also Associate Professor of Philosophy and Affiliate Faculty at the Center for Mind and Brain. My own research is in the theoretical foundations of cognitive science: I explore the relationship between explanations of the mind found in psychology, neuroscience, linguistics, and philosophy. I was hired by UC Davis when they launched their Cognitive Science major in 2015, and I have helped to build up a thriving undergraduate program which currently has over 600 majors. I regularly teach our Introduction to Cognitive Science class, which is a core requirement of the major, and I am always impressed by the quality and enthusiasm of our Cognitive Science students.

At UC Davis, Cognitive Science students are drawn to the interdisciplinary nature of the program, the career opportunities it offers, and the cutting-edge nature of the classes. The major has been successful at attracting a diverse range of students, particularly women and underrepresented minorities. One of our alumni, Antoinette Banks, was just awarded the Pharrell Williams Black Ambition grand prize of \$1 million for an educational app she developed.

The University of California has an exceptionally strong reputation in Cognitive Science: UC San Diego launched the first Cognitive Science department in the world, for example. My understanding is that UC Riverside is the only UC without a Cognitive Science program, and so this is a timely proposal – particularly as it also includes the fast-growing field of Information Science. I offer my full support to this proposed new major.



Dr Zoe Drayson

Director, Cognitive Science

Associate Professor, Philosophy

Affiliate Faculty, Center for Mind and Brain



MARK STEYVERS
DEPARTMENT OF COGNITIVE SCIENCES
2316 SOCIAL & BEHAVIORAL SCIENCES GATEWAY BUILDING
UNIVERSITY OF CALIFORNIA, IRVINE, CA 92697-5100

EMAIL: MARK.STEYVERS@UCI.EDU
PHONE: (949) 824-3771
FAX: (949) 824-2307
URL: [HTTP://STEYVERS.SOCSCI.UCI.EDU](http://STEYVERS.SOCSCI.UCI.EDU)

RE: Proposal for a New Major in Cognitive and Information Science at UCR

I am writing in support of the proposal for establishing a new major in Cognitive and Information Science at the University of California, Riverside, spearheaded by Professors Graham, Schwitzgebel, Nelson, and their colleagues. My endorsement of this initiative stems from my position as Undergraduate Director in Cognitive Science at the University of California, Irvine, and my experience in the field.

The integration of Cognitive Science and Information Science into a single major is timely and highly relevant. In today's world, where technology is a big part of our lives, it's crucial to understand how our thinking works with these technologies. This major is not just keeping up with current trends in education and the job market, but it's also something that students are increasingly interested in. It prepares them for a future where understanding technology and how we think and interact with it is key.

Furthermore, the establishment of this program at UCR is a significant step in addressing the gap within the UC system. As the only UC campus without a Cognitive Science major, minor, or program, UCR has a unique opportunity to fill this void and offer students a comprehensive and interdisciplinary education in this area. The proposed program's interdepartmental nature is commendable and it makes sense to administratively house the program within the Philosophy Department. The arrangement will enable students to benefit from a diverse range of perspectives and expertise, fostering a well-rounded understanding of the subject matter.

In summary, I support the proposal for the new major in Cognitive and Information Science at UCR. This program will not only enhance the academic offerings at UCR but will also provide invaluable opportunities for students to engage in a field that is increasingly relevant and vital in our digital age. Should you require any further information or insights from my end, please feel free to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Mark Steyvers", is written over a series of horizontal lines.

Mark Steyvers
Professor
Department of Cognitive Sciences
University of California, Irvine



November 13, 2023

To the curriculum committee:

I am pleased to write in support of the initiative to start a major in Cognitive and Information Science at UC Riverside. The fact that Riverside is the only UC campus without a major in cognitive science is certainly a fact that should be rectified. But there are additional features of this proposal that make it especially valuable.

Since the middle of the 20th century, there have been a variety of interdisciplinary academic paradigms in topics related to cognition — artificial intelligence, cognitive science, computer science, cybernetics, game theory, and information theory are several of these. While computer science and cognitive science are the two of these that have been most widely adopted as majors, there are some universities that have notably adopted other terms, such as Stanford's Symbolic Systems Program, and MIT's department of Brain and Cognitive Sciences. The phrase "Cognitive and Information Science" does a better job than many of these other terms at conveying the idea that there is a unified subject matter to be studied both in the context of the human mind, and in the context of various artificial systems that process information, ranging from the symbolic systems of the 1970s and 1980s to the neural networks of today, to whatever future systems will be designed in coming decades.

One of the research topics that the philosophy department at UC Riverside has historically been most known for is the study of action and free will, which is of course one topic closely related to some of the core issues for this interdisciplinary area of research. But the department is also known generally for its interdisciplinary and methodologically wide-ranging work. This combination of focus and generality makes the department a particularly natural home for a major like this one.

Student interest in this sort of area is only likely to continue growing in coming years, as new developments in artificial intelligence and related fields confront us with the question of which aspects of the mind are distinctively human, and which are well-duplicated by other sorts of systems. This particular proposal seems like a very promising one for UC Riverside.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kenny Easwaran".

Kenny Easwaran
Associate Professor
Department of Logic and Philosophy of Science
UC Irvine
k.easwaran@uci.edu
(650)269-5738



Department of Philosophy
Irvine, CA 92697-4555

December 8, 2023

Dear Colleagues,

I write in support of the proposal for a new major in Cognitive and Information Science at UC Riverside.

Cognitive Science is a very popular major because it connects some of the oldest questions in philosophy with some of the most recent findings in the sciences. Students not only learn about the mind-brain relation and the connection between language and thinking but also the relationship between philosophy, psychology, computer science and linguistics. Since cognitive science integrates the knowledge and methods of a number of disciplines, the skills acquired can be applied to most of the fields and professions related to the four disciplines, including: telecommunications, information and language processing, artificial intelligence, cognition software development, medical analysis, speech pathology, data retrieval, human-computer interaction, therapy and education.

I was surprised to learn that UC Riverside is the only UC without a Cognitive Science major, minor, or program. I applaud the Department of Philosophy for taking the initiative to set up a major in Cognitive and information Science at UC Riverside. The major will probably be as successful at Riverside as it is at the other UC campuses. Students will welcome the new major that uses a wide range of methodologies from mathematical methods and experimental approaches to psychology and neuroscience, through the computer modelling of mental processes and philosophical debate.

The labor market needs students with interdisciplinary education. Many students leave college having taken an array of seemingly disconnected courses, with those courses outside their declared major seeming irrelevant to their interests and unrelated to the world beyond campus. Many students may ask themselves: If I am a science or engineering major, why do I need to know about ethics, history, writing, and design? Shouldn't I just focus on the classes that will prepare me to get a job after graduation and to succeed at that job? A holistic education that integrates the humanities and sciences makes students more attractive candidates for employers and more successful in their future career. A major in Cognitive and Information Science promises to give students such a holistic education. It helps them understand the connections between diverse forms of human knowledge so they can appreciate, for example, the ethical dimensions of writing software that collects people's personal data without their knowledge or the importance of intuitive and aesthetic design in the engineering of a profitable smartphone. I very much hope that UC Riverside undergrads can soon major in Cognitive and Information Science.

Sincerely,

A handwritten signature in cursive script that reads "Sven Bernecker".

Sven Bernecker
Professor VIII of Philosophy
Co-Director of Medical Humanities Minor
University of California, Irvine



DEPARTMENT OF PHILOSOPHY

Los Angeles, CA 90095-1451 Dodd 321, Box 951451

Phone: (310) 825-4641

Fax: (310) 825-6040

December 2, 2023

Dear Colleagues,

I write in support of the proposed Cognitive and Information Science (CIS) major at UC Riverside. As a philosopher of science who has published and taught courses on several topics that lie at the core of the CIS major, I can attest to its value. Students are productively challenged to integrate the different methodologies, hypotheses, and bodies of evidence that characterize the different disciplines contributing to CIS. Given the boom of artificial intelligence and machine learning in recent years, the ability to view a problem through the lenses of different disciplines and stakeholders is invaluable. In my estimate, UC Riverside's proposed CIS curriculum ably achieves this goal. In my experience, such majors frequently attract students who are more curious and intellectually nimble than the average student in many of the adjacent fields. (The ones with which I am most familiar are philosophy, linguistics, and psychology.) One of the main attractions of this major is its capacity to educate students with a diverse toolbox of different analytical reasoning skills: logic, computation, formal semantics, statistics, mathematics, etc. Any of the contributing disciplines might only familiarize students with a proper subset of these kinds of reasoning, whereas the CIS major holds the promise of familiarizing them with far more. In my experience, students well-trained in these different skills are more circumspect in identifying, formulating, and solving problems. Since many of these forms of reasoning are domain-neutral, this also frequently enables students to extend their insights to novel problems. Consequently, I think you would be well-served to introduce CIS as a major at Riverside.

Sincerely,

A handwritten signature in blue ink, appearing to be "K. Khalifa", written over a light blue grid background.

Kareem Khalifa
Professor of Philosophy

UNIVERSITY OF CALIFORNIA

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SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS

UNIVERSITY OF CALIFORNIA, MERCED
P.O. BOX 2039
MERCED, CA 95344
(209) 724-4335
FAX (209) 724-2912

December 6, 2022

To whom it may concern,

I am writing in support of the proposal for a new major in Cognitive and Information Sciences proposal at UC Riverside.

First, some background on myself. I was hired as a founding faculty member at UC Merced in 2004. I was the first philosopher hired and the second cognitive scientist (I was hired a few months after Teenie Matlock). I have been involved in every aspect of creating the cognitive science program here over the past 19 years: the undergraduate programs (BA and BS), the graduate program, the terminal masters program, the creation of the "bylaw 55", etc. Cogsci has been extremely successful. Graduates of the PhD program have gotten academic jobs at all levels (Stephanie Huetten, Bodo Winter, Alex Paxton and Ben Falandays are notable examples at research universities), and industry jobs at places like Apple, Facebook, Accenture, and Netflix. The undergraduate majors have been similarly successful, with good placements in graduate programs and industry. Note that the program has been, since its inception, a self-standing department. Philosophy originated as part of CIS but recently became a separate department. In a sense we have done the reverse of what is happening at UCR!

I strongly support the proposal at UCR. Cognitive science is a recognized area of inquiry that is represented at all the UC campuses except, I am discovering, UCR. It is obviously timely given everything that is happening with AI right now, and it consistently draws a certain type of student who is interested in the mind, the brain, and information processing (i.e. looking for something slightly different than a psychology or neuroscience degree, for example), and worried or excited (or both) about the impact of AI on society. Students in my experience often come from other majors, like computer science (CS) or psychology (which are already impacted, so this has been welcomed by those departments, and we have strong working relationships). A student might not care so much about the details of algorithms and databases in their CS degree, for example, but have a genuine interest in programming various types of AI simulations and in issues relating to AI or neural networks or data science. Double majors with areas like psychology are also common.

Efforts should be made to ensure students in the major have a feeling of identity, of being part of something that has a robust existence. Many of our faculty came from programs that were cross-disciplinary and without a separate department, and they describe it as sometimes a bit alienating. We are facing the issue now as we design a neuroscience program that is distributed across other programs. To address the issue we are hiring one person to run it which will help, and are adding a few “neuro only” courses. Your three CIS courses in the proposal will help. The more “CIS only” courses and experiences the better I think. Otherwise they could be kind of lost among all the other majors. In the long run, if a separate department is possible, it’s worth pursuing.

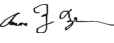
If you have any questions, please feel free to contact me at jyoshimi@ucmerced.edu.

A handwritten signature in black ink, appearing to be 'Jeff Yoshimi', with a stylized, flowing script.

Jeff Yoshimi
Professor of Philosophy and Cognitive Science, and Founding Faculty
UC Merced

Date: November 15, 2023

To: Academic Senate
University of California, Riverside

From: Aaron Zimmerman 
Chair, Department of Philosophy, UCSB
Chair, Graduate Emphasis in Cognitive Science, UCSB

Re: Support for Cognitive and Information Science Major at UCR

Cognitive and information science is an interdisciplinary study of the mind and mental processes, which adopts a theoretical orientation that arose in the 1950s and 60s. The idea that the mind contains representations is a very old one. It is shared by every major philosopher of mind in the western canon. But in the 1940s behaviorist psychologists, led by Skinner, were pressuring theorists to reframe their explanations to avoid talk of representations. Chomsky deflated Skinner's program by showing that Skinner could not avoid using representation and similarly "mental" concepts, to explain complex behaviors. Most saliently, Chomsky ridiculed Skinner's explanations of linguistic communication, which is often creative, holistic, and stimulus-independent.

The original cognitive scientists were those who resisted behaviorism, and went beyond "folk psychology," by comparing the mind (or certain aspects of the mind) to a computer, utilizing the notions of information and representation to this end. Those who embrace this theory of mind needn't equate mentality with computation, but processes sandwiched between sensation and movement are thought of in this way, and the computational model is increasingly extended "back" to perception and forward to "motor control."

At this point in intellectual history, cognitive science can be defined as the scientific study of the mind, and philosophical reflection on it, that is in some robust way guided by a theory or picture according to which "core" mental processes are computational, where computation is understood as the generation and manipulation of representations or states of information. This definition of the research program doesn't yet build in anything about the interdisciplinary nature of cognitive science explanations. But one of "guiding ideas" in cognitive science, since its rise in the 1950s and 60s, is that explanations of minds and the complex activities of humans and other animals, must be multi-level and multi-dimensional and so bring in the history, function, and biological realization of those psychological processes responsible for these activities. So understood, the representational/computational theory of mind provides a framework for thinking of the contributions of Philosophy, Linguistics, Anthropology, Neuroscience, Computer Science, and Psychology to explanations of mental processes and the tasks they are used to execute.

At UCSB, I chair an interdisciplinary graduate emphasis program in cognitive science, which we have been offering for over twenty years. Participating graduate students complete a seminar in cognitive science and four additional approved courses in cognitive science offered by at least three different, participating departments. They must give a research presentation and complete

a dissertation on an approved topic related to the field, and they must have at least two cognitive science faculty on their dissertation committee. Details can be found here:

<https://www.cogsci.ucsb.edu/graduate-emphasis>

In addition, the cognitive science community at UCSB is looking to introduce an undergraduate major in cognitive science akin to the one proposed by Professor Graham and colleagues at UCR. This effort is being spearheaded by Distinguished Professor Adina Roskies, a newly hired philosophy professor at UCSB, who holds PhDs in both philosophy and neuroscience, along with a JD from Yale Law School, and is therefore perfectly suited to the task of bringing together a diverse group of scholars united by a shared model of the mind.

Though I do not have any personal experience constructing an undergraduate major in cognitive and information science, I have reviewed the proposal prepared by Professors Graham, Nelson and Schwitzgebel, and have no doubts about its soundness and quality. Students who satisfy the proposed course requirements will be exposed to various components of the cognitive sciences and critical reflection on them. They will have in-depth knowledge of some fields of cognitive and information science—whether they chose computer science, neuroscience, or philosophy—and they will also have a sense of how these fields are integrated by those who adopt the cognitive/representationalist framework for understanding the mind described above. They will be well-suited to graduate work in any of these disciplines, and gain a well-rounded understanding of work on cognition and information-processing that they could not acquire by pursuing any one of those fields of study that together constitute the cognitive and information sciences. My colleagues and I promise to keep abreast of this program's development at UCR, as a model of the undergraduate major we are also in the process of developing.



PROFESSOR JONATHAN COHEN
DEPARTMENT OF PHILOSOPHY
9500 GILMAN DRIVE, DEPT. 0119
LA JOLLA, CALIFORNIA 92093-0119

(760) 814-1110
FAX: (858) 534-8566
cohen@ucsd.edu
<http://aardvark.ucsd.edu>

November 13, 2023

Peter J. Graham
Associate Dean, UCEAP
Professor of Philosophy and Linguistics
Department of Philosophy
900 East University Avenue
Humanities and Social Sciences 1604
University of California, Riverside
Riverside CA 92521-0201

Dear colleagues:

I write to support the new proposed major in Cognitive and Information Science at UC Riverside. I have extensive experience with the field from a number of perspectives: I completed a certificate program in cognitive science while doing a PhD in philosophy at Rutgers, have been a faculty member in UC San Diego's Interdisciplinary Cognitive Science Program for many years, designed and gained approval for a minor in the philosophy of cognitive science in my own department, and have published widely on topics in cognitive science. Thus I am well positioned to assess the merits of the proposal for a new major in cognitive science at UC Riverside.

Cognitive Science is an important and newly timely intellectual area with a history of rich and substantive interdisciplinary interactions, and one for which there is a significant current surge in demand for instruction. In its short history, cognitive science has seen important advances in a wide variety of theoretical and applied topics — think here of important advances in the study of human and artificial vision, the syntax and semantics of natural language, structure/function connections in computational neuroscience, results in decision theory, artificial intelligence, human computer interaction, the psychology of altruism, and on and on. The subareas of the subject have each grown into substantive fields of their own, but remain connected by shared assumptions and methodologies.

UC Riverside currently lags the other UCs in lacking institutional infrastructure for the area, so I am especially gratified to see the current proposal. The proposed major would complement allied departments on campus, and would connect researchers and students in adjacent fields.

I am happy to support the establishment of the major without any reservations. If I can answer any further questions about the above, please don't hesitate to contact me at your convenience.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jonathan Cohen', is centered below the 'Sincerely,' text.

Jonathan Cohen
Professor and Associate Dean, School of Arts and Humanities



UNIVERSITY OF MASSACHUSETTS
AMHERST

Department of Philosophy
150 Hicks Way, E305 South College
University of Massachusetts
Amherst, MA 01003-9274

Philosophy Main Office

E302 South College
Phone: (413) 545-2330
Fax: (413) 577-3800

November 13, 2023

To Whom It May Concern:

I write in support of the proposed new major at UC Riverside in Cognitive and Information Science. As the proposal points out, UC Riverside is the only campus of the University of California which does not have a cognitive science major, minor, or program. This is not only out of step with the other UC campuses; it is out of step with other major research universities. Work in the cognitive and information sciences has been interdisciplinary since the 1950s. There is a robust program of research here which requires deep interdisciplinary knowledge. Creating a major in this area will help to guide students to a program of study which will be more than just the sum of unrelated parts; it will, instead, allow them to see the important connections between work in what are now, at Riverside, separate programs of study. This will be of great intellectual value to your students.

In addition, a program of this sort will help your students on the job market. The cognitive and information sciences are an ever-growing part of the economy, and work in this area requires a broad base of understanding in what are now separate departments at Riverside. Students who have a major in the proposed area, rather than a ragtag collection of courses, will be better placed for employment.

I should say that my own research is deeply interdisciplinary. I am interested in the ways in which philosophical views about the nature of knowledge have been influenced by views about how the mind works. Before the late nineteenth century, psychology faculty were part of philosophy departments, and it is only with the rise of experimental psychology that separate departments of psychology began to be created throughout the world. As we have come to understand more and more about the mind, we see that much of the philosophical work on knowledge was based on mistaken views about the mind. I have tried to show how cognitive science allows, not only for a more accurate view about psychological processes, but for far improved and accurate philosophical views about the nature of knowledge. Many of my graduate students have taken part in a program here at the University of Massachusetts not unlike the one proposed for UC Riverside; it awards them a cognitive science certificate for taking a number of related courses outside the philosophy department, ones which form a coherent body of study. It has substantially enriched their education and informed their philosophical research.

The Riverside campus has a first-rate collection of faculty members in the areas needed to support this major, and the proposal lays out an excellent program. I very much hope that this proposed major will be implemented.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hilary Kornblith', written in a cursive style.

Hilary Kornblith
Distinguished Professor

12 December 2023

To: UC Riverside Faculty Senate
From: Joe Cruz, Professor and Chair of Philosophy,
Professor of Cognitive Science, Williams College
Re: Proposal for a New Major in Cognitive and Information Science at UCR

Dear Senate Members:

Cognitive scientists aim to understand the mind, thought, intelligence, and adaptation in human beings, nonhuman animals, and artificial systems. It is one of the most active areas of interdisciplinary research in the academy, attracting students from STEM fields like neuroscience and natural language processing to students engaged in humanistic study such as anthropology and music. I am therefore writing in enthusiastic support of the philosophy department's timely and well-conceived proposal for a new major in cognitive and information sciences.

I am chair of the philosophy department and a founding faculty member of cognitive science at Williams College (I have a joint PhD in philosophy and cognitive science). My work is on neural network models and how micro level accounts of biological intelligence interact with more macroscopic, embodied levels of analysis. In addition to several upper level seminars in the field, I routinely teach the introduction to cognitive science course.

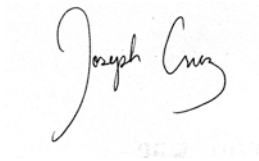
At my institution, our cognitive science offerings are consistently oversubscribed and there is no question that there is a notable buzz around the program. I think the explanation for the appeal is straightforward: The work is both of-this-moment and practical in the sense that it centrally informs discussions of artificial intelligence and information technology, but it is also broad and deep in that it engages questions about consciousness, knowledge, and our technological future. The interdisciplinary aspect is credible and wide-ranging. My program draws faculty from biology, philosophy, computer science, psychology, linguistics, neuroscience, math, and science and technology studies.

The UCR philosophy department proposal is careful, up-to-date, and straightforwardly achievable. It is reasonable that philosophy should be the administrative home of the major—there is plenty of precedent in that regard and the UCR philosophy faculty is nationally admired

—but, as the proposal indicates, it should be emphasized that faculty from across the university will be involved. I especially appreciate the way the UCR philosophy department's proposal makes explicit that it incorporates information sciences. This makes salient yet additional dimensions of collaboration.

I anticipate that, should the proposal be implemented, cognitive and information sciences at UCR will quickly attract considerable and sustained interest among students. Once again, I heartily support it.

Respectfully,

A handwritten signature in black ink, reading "Joe Cruz". The signature is written in a cursive style with a large, stylized "J" and "C".

Joe Cruz
Williams College
Professor and Chair of Philosophy
Professor of Cognitive Science



November 30, 2023

To Whom it May Concern:

I write in support of the creation of a Cognitive Information & Science Major at UC Riverside.

I am currently Vilas Distinguished Achievement Professor of Philosophy at the University of Wisconsin-Madison, and have recently completed a stint as Chair of the Philosophy Department. But before all that I was a UC Berkeley PhD (2008), and remain a proud alumnus of the UC system.

Frankly, I was shocked to learn that Riverside doesn't have something like a Cognitive Science major already. While they may be housed in different departments, every major research university I can think of has some form of a cognitive science program. To call cognitive science a highly-respected, fully-developed, well-intrenched field of study would at this point in intellectual history be an understatement.

"Why doesn't UW-Madison have a department of Cognitive Science, then?" you might ask. Well, some universities (for instance, Johns Hopkins and UCSD) do have such departments. But the first thing those departments say about themselves is that they're highly interdisciplinary. By its nature, cognitive science as a field requires drawing not only on empirical studies of psychology and biology (especially neuroscience), but also on the study of information, information processing, and reasoning. Some of the most fruitful intellectual exchanges I've had in Madison have come at the meetings of an interdisciplinary group run by our cognitive scientists (called "Human, Animal, and Machine Learning: Experiment and Theory", aka HAMLET).

Which is why I think a program in Cognitive and *Information* Science is an especially canny proposal. For one thing, this is a natural pairing. It's a combination of the theoretical study of how information (especially quantitative information) *should* be processed with the empirical study of how it *does* get processed. This has been a crucial evolving frontier in the literature, as we seek to understand the myriad ways in which data dissemination, processing, and understanding has recently become, shall we say, disrupted (?) in present society. A great deal of new work is going into why the brain picks up on and believes the information it does, and how lessons are drawn from that information by members of the populace.

I predict that a program like this will also be highly attractive to students. Cognitive science classes are always a draw. But (speaking again from local experience), data science has become increasingly popular. At UW, the quickest-growing major over the past decade has (unsurprisingly) been computer science. But we recently formed a new school, called Computing, Data, and Information Science, which merged CS with statistics and our Information School. Under that aegis a new data science major has emerged, and we've all been shocked by its rapid growth in enrollment, in many cases at the expense of CS. Clearly

Department of Philosophy

University of Wisconsin – Madison 5185 Helen C. White, 600 N. Park St., Madison, WI 53706
608/263-3700 608/263-5335 Fax: 608/265-3701

many of the students who had been going into computer science are actually most interested in how to understand and manipulate data.

Finally, let me comment on the involvement of philosophers in this project. Scholars of intellectual history will know that most of the empirical sciences—and many other fields—were once part of "natural philosophy". Economics and psychology, in particular, only in the past century and a half separated out from philosophy as distinct disciplines. Such topics as rational choice theory and computer science were born from philosophical debates even more recently than that. So for what it's worth as a matter of history, helped create many of the disciplines relevant to the proposed major.

Perhaps more relevant to the present day, however, are the ways that Riverside's philosophy faculty make sense in the context of those disciplines. Looking at the proposed faculty list, I have personally been familiar with the work of Luca Ferrero, Peter Graham, and Eric Schwitzgebel for decades, and can vouch that each of them makes a fits this endeavor well. Schwitzgebel, for instance, has made internationally-reknowned contributions to the debate over the nature of belief, and is in constant conversation with empirical cognitive scientists working on the issue.

More broadly, it's *reasonable* for philosophers to be involved in these conversations. When it comes to issues in the nature of mind, and the methodology of studying the mental, this has been a terrian of philosophical work for centuries. As for information science, many of the most important discussions about how data should be assessed, and the strengths and weaknesses of various statistical methods, happen in a philosophical context. (I recently published a two-volume text with Oxford University Press, *Fundamentals of Bayesian Epistemology*, evaluating Bayesian approaches to statistics and probability.)

But most importantly, we've reached a place in society where there are important ethical and political questions about how information should be gathered and used. How we build studies, what we attend to, how we spread information, and who gets to control those processes are all issues that merit study from a moral point of view. The very people who run our technological information systems are asking for help from moral and political philosophers. Every student who studies information science should consider its ethical ramifications. And students *want* to think about these issues—we literally can't find enough teachers at UW to meet student demand for such classes.

I hope all this information provides evidence for the conclusion that the proposed Cognitive and Information Science major would be a markedly good idea for UC Riverside. I am happy to write in its support.

Sincerely,



Michael Titelbaum
Vilas Distinguished Achievement Professor
Department of Philosophy
University of Wisconsin-Madison
titelbaum@wisc.edu

Rebecca Copenhaver

Professor of Philosophy

Professor of Philosophy-Neuroscience-Psychology

Dear Members of the Academic Senate:

I write in support of the proposal for a Cognitive & Information Science proposal, to be housed in the philosophy department at UC Riverside.

I'm in a good position to speak to the educational and social value of such a program, as well as to why housing it in a philosophy department is especially beneficial to students and to the university. I'm a Professor in Philosophy as well as the longstanding and immensely successful Philosophy-Neuroscience-Psychology (PNP) program at Washington University. PNP is an undergraduate major, minor, and a graduate PhD program, both housed within and administrated by the philosophy department, with faculty in philosophy, psychology, biology, neurobiology, linguistics, and anthropology. We have the most majors in the humanities, and we have one of the largest majors on campus. Our students go on to medical school, graduate work in psychology, graduate work in the brain sciences, clinical work, social work, and finance.

Let me speak first to the educational value of a Cognitive & Information Science program before speaking to the value of housing it within a philosophy department.

The cognitive and information sciences are developing rapidly and in unpredictable ways that will affect individual lives, cultures, societies, and governments on a global scale. We've already seen how something as seemingly innocuous as a social media site can affect the outcomes of elections. New forms of artificial intelligence, such as large language learning models (for example, Chat GPT), are already changing education itself. Enormous amounts of money are being invested in developments in the data sciences and artificial intelligence, often by large for-profit corporations. These emerging technologies are informed by and affect the cognitive and brain sciences: they originate as models for understanding human and non-human intelligence, but they also change how we think. Our daily activities – particularly activities that require thought, judgment, and social interaction – are suffused with emerging technologies, some of which operate in ways we do not understand.

Students who major in Cognitive & Information Science will be in a position to confront the complexity of the consequences of these emerging technologies, whether go on to medical school, employment at a technology company, finance, psychology, social work, education, or the many areas that will be transformed, and transformed rapidly, by these emerging technologies.



Students who do not major in Cognitive & Information Science but take a course or two will be able to think about and reflect on the complex social, cultural, scientific, and political contexts in

rcopenh@wustl.edu
Washington University in St. Louis
Campus Box 1073
One Brookings Drive
St. Louis, MO 63130-4899

which these technologies are being developed and on which these technologies will have profound effects. Taking just one or two courses from Cognitive & Information Science will better prepare students for the world we find ourselves in the world that is quickly arriving.

Why house it in a philosophy department, though? Doing so places Cognitive & Information Science within the humanities. This is exactly where such a program is best placed. Universities need a truly interdisciplinary approach to the cognitive, information, and brain sciences to ensure that we understand emerging technologies in human terms and that those who do so know the science. We can't afford to think about emerging technologies without thinking about them in a historical, cultural, social, political context of human values. And we can't afford to have the people who are thinking about technologies in this way to not know what they're talking about. They need to know the science well enough to be taken seriously by those who are investing in and creating these technologies. The most effective and responsible approach is one that recognizes the complexity and practical significance of the changes we're facing. Philosophy is the discipline that is best placed to host this irreducibly interdisciplinary conversation.

I should add that placing Cognitive & Information Science within the philosophy department is tremendously beneficial to students as well. Many students inclined towards the humanities have anxiety about taking college-level courses in the natural and social sciences. They're less intimidated to take a course, or even major, in a Cognitive & Information Science program that is housed within the humanities.

Let me end by saying a bit about how this works at WashU. Philosophy and PNP are separate, with separate majors, minors, and in our case, graduate program. However, both are administrated out of the philosophy department. We have two chairs and two administrative assistants but the community that is formed by the PNP program across campus (events, postdoctoral fellows, conferences, colloquia) has its home in the philosophy department. This is both symbolically and practically important. Symbolically for the reasons I gave above, practically because such a program requires administrative support, a budget, and a structure that ensures that there are no conflicts of interest between philosophy and PNP. It works well for us, and as I've said, it's a signature major here at WashU.

In closing, I urge you to approve a Cognitive & Information Science proposal, to be housed in the philosophy department at UC Riverside. Your students need the kind of programming such a course of study would provide, and the research by faculty connected by such a program would be better able to meet the challenges that a great public research institution like UCR are charged with facing on behalf of the public.

Sincerely,



Rebecca Copenhaver
Professor of Philosophy
Professor of Philosophy-Neuroscience-Psychology



November 30, 2023.

UC Riverside Cognitive and Information Science Programme

I write to express my strong support for the proposal to start a Cognitive and Information Science Programme at UC Riverside, housed by the Department of Philosophy. I have read the carefully crafted proposal and believe that the programme will offer much of value to its students. Looking at the list of required courses and electives one can tell that they will get a solid, interdisciplinary education with philosophy, computer science, and cognitive psychology at the core and ample opportunity to make significant inroads into related disciplines such as a linguistics, statistics, neuroscience, mathematics, and biology.

Given the multi-faceted education that the Cognitive and Information Science programme will offer I believe that students will place well after graduation. They will have a unique skill set and body of knowledge. They will be able to tackle and understand a wide range of issues, problems, and questions pertaining to data or information—technical problems that require familiarity with programming, logic, theoretical linguistics, or statistics; issues whose resolution require a grasp of the workings and mechanisms of language and cognition; challenges that are most successfully addressed through the kind of conceptual rigour acquired through comprehensive training in philosophy. Crucially, students graduating from the Cognitive and Information Science programme will be able to make progress on issues, problems, and questions that are best approached—or which, perhaps, can *only* be approached—by bringing together *all* of the aforementioned skills and types of knowledge. Cognitive and Information Science students will be incredibly well positioned to pursue careers in both the private sector and the public sector, as well as in research and academia.

The excellent faculty in the Department of Philosophy at UC Riverside have the expertise needed to launch and spearhead the proposed programme—which, no doubt, will be a great hit among students and add much of value to the university.

Best wishes,



Nikolaj Jang Lee Linding Pedersen

Underwood Distinguished Professor
Underwood International College
Yonsei University

Director, Veritas Research Center, Yonsei University
Editor in Chief, Asian Journal of Philosophy
Co-founder, Asian Epistemology Network
Co-founder, Eastern Hemisphere Language & Metaphysics Network

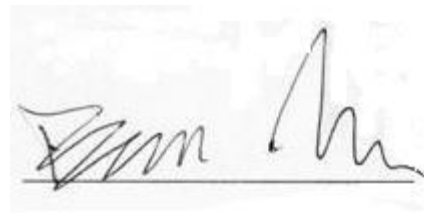
Office +82 (0)32-749-3010
Mobile +82 (0)10-3011-0171

Email nikolaj@yonsei.ac.kr
nikolajpedersen@gmail.com

public attention to a variety of issues related to cognitive and information science (AI being only one of these).

Please don't hesitate to contact me if you have any further questions. My email address is bence.nanay@uantwerpen.be

Sincerely,

A handwritten signature in black ink, appearing to read 'Bence Nanay', written over a horizontal line.

Bence Nanay

Appendix G. New Course Proposals

Catalog Descriptions & Course Syllabi

CGIS 001 Introduction to Cognitive and Information Science 4. Lecture, 3 hours. Discussion, 1 hour. An introduction to the interdisciplinary field of Cognitive and Information Science that studies the nature of minds, by incorporating findings from Anthropology, Artificial Intelligence, Computer Science, Information Science, Linguistics, Mathematics, Neuroscience, Philosophy, Psychology, and Statistics. *Prerequisite(s): None.*

CGIS 100 Fundamental Approaches and Applications 4. Lecture, 3 hours. Discussion, 1 hour. Advanced introduction to fundamental approaches to cognitive and information science. Topics include mental architecture, computation, information-processing, artificial intelligence, connectionism, neural networks, robotics, embodied cognition, with applications to various cognitive capacities, including perception, language, memory, reasoning, mind-reading, and decision-making. *Prerequisite(s): CGIS 001; PHIL 008 or PHIL 008H or CS 011 / MATH 011; CS 009A or CS 042.*

PHIL 136 Philosophy of Biology 4. Lecture, 3 hours. Additional reading, 3 hours. Examines philosophical issues central to the life sciences. Topics include life, evolutionary theory, fitness, the units of selection, information, genetic and epigenetic inheritance, and the evolution of minds. *Prerequisite(s): One course from Biology or another life science and CGIS 001 or PHIL 001 or PHIL 006 or PHIL 010 or PHIL 010H or PHIL 114 or PHIL 133 or PHIL 134 or PHIL 135 or PHIL 137 or PHIL 144.*

PHIL 148/CGIS 148 Philosophy of Information 4. Lecture, 3 hours. Additional reading, 3 hours. Examines key issues in the philosophy of information, including theories of semantic and naturalistic information, informational ontologies, and the intersections of logic, computation, and cognition. Topics include informational pluralism, structural realism, digital ontology, semantic content, and the use of information in cognitive science and the biological sciences. *Prerequisite(s): CGIS 100 and PHIL 124.*

PHIL 146/CGIS 146 Philosophy of Computer Science and Artificial Intelligence 4. Lecture, 3 hours. Extra reading, 3 hours. An advanced introduction to the Philosophy of Computer Science. Topics include philosophy of science, the nature of computer science, computation, computer programs, artificial intelligence, and computer ethics. *Prerequisites: Prerequisite(s): CGIS 100 and PHIL 124. Recommended, one or more courses in Computer Science and Engineering.*

PHIL 147 Pragmatics 4. Lecture, 3 hours. Additional Reading, 3 hours. An upper-division introduction to the study of language use in context. Topics include implicature,

presupposition, speech acts, relevance theory, and the semantics-pragmatics interface. Emphasis on theoretical frameworks and empirical data from linguistics, philosophy of language, and cognitive science. *Prerequisite(s): CS 011 / MATH 011 or LING 021 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 107 or PHIL 130 or PHIL 132.*

PHIL 170 Ethics of Artificial Intelligence 4. Lecture, 3 hours. Additional Reading, 3 hours. An upper-division examination of the ethics of artificial intelligence, including algorithmic bias, rights of AI entities, and societal impacts. *Prerequisites: Upper-division standing or consent of the instructor.*

PHIL 175/CGIS 175 Philosophy of Perception/Fundamentals of Perception and Cognition 4. Lecture, 3 hours. Additional reading, 3 hours. Examines the nature of perception, especially vision, from a philosophically informed interdisciplinary point of view. *Prerequisite(s): CGIS 001 or CS 011 / MATH 011 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 010 or PHIL 010H or PSYC 001.*

PHIL 180 Advanced Topics in Theory of Knowledge 4. Lecture, 3 hours. Additional reading, 3 hours. *Prerequisite(s): CS 011 / MATH 011 or PHIL 008 or PHIL 008H or PHIL 124; and at least one course from LING 151, PHIL 130, PHIL 131, PHIL 132, PHIL 133, PHIL 134, PHIL 136, PHIL 137, PHIL 139, PHIL 142, PHIL 143, PHIL 144, PHIL 148, PHIL 146, or PHIL 147.* Examines key issues in contemporary research in the theory of knowledge. Topics may include the analysis of knowledge, recent work on radical skepticism, empirical findings relevant to theories of knowledge, semantic and contextualist approaches, social epistemology, and feminist approaches to knowledge. Course is repeatable for a maximum of 12 units as topics vary with consent of the instructor.

CGIS 001

Introduction to Cognitive & Information Science

INSTRUCTOR
MEETING ROOM & TIMES
OFFICE HOURS

Catalog Description

CGIS 001 Introduction to Cognitive and Information Science 4. Lecture, 3 hours. Discussion, 1 hour. An introduction to the interdisciplinary field of Cognitive and Information Science that studies the nature of minds, by incorporating findings from Anthropology, Artificial Intelligence, Computer Science, Information Science, Linguistics, Mathematics, Neuroscience, Philosophy, Psychology, and Statistics. *Prerequisite(s): None.*

Course Description

This course is an introduction to the interdisciplinary field of Cognitive and Information Science (CGIS), a field that incorporates research and results from a variety of other disciplines, including but not limited to Anthropology, Artificial Intelligence, Computer Science, Information Science, Linguistics, Philosophy, and Psychology. The goal of CGIS is to discover how minds work: (non-human) animal minds, artificial minds (can computers think?), and especially our own (how does the human mind work?). CGIS investigates different kinds of minds from various levels: the most abstract (what is it to have a mind?); the functional (what are the different types of mental abilities and processes?); the computational (what are the information-processing algorithms or processes that carry out these functions?); and the neurological or mechanical (how do brains or machines execute these algorithms?). Among the core principles of CGIS as applied to human minds are the ideas that mental processes are typically unconscious and computational, and that the mind is a biological organ housed in the brain and shaped by evolution, where many mental capacities are modularly implemented and innate. This course articulates these core principles while applying them to some specific mental processes, including perception, language, mental imagery, attention, amongst others, as well as the nature and function of consciousness.

Learning Goals

The primary goal of this course is for you to think about and to understand the mind from a scientific perspective. By the end of the course, you should be able to:

- (1) Identify the problems that cognitive and information science addresses.
- (2) Articulate the fundamental assumptions of CGIS.
- (3) Describe the major empirical and theoretical insights CGIS offers into understanding various mental processes.
- (4) Describe how the various component disciplines contribute to CGIS.
- (5) Describe the various empirical approaches CGIS uses to discover how minds work.

Resources

The required textbook is José Luis Bermúdez, *Cognitive Science: An Introduction to the Science of the Mind*, Fourth Edition (Cambridge University Press, 2023). It is available through the bookstore and elsewhere.

iLearn will function as an information hub for the course, and will contain a variety of important resources such as assignment instructions and lecture slides, so please make sure to check it regularly. Also, I will often use iLearn to make important announcements about the course, so make sure that your iLearn notifications are set up appropriately.

Attendance

The number one predictor of grades in college classes is attendance. And since grades are correlated with learning, and since I want you to learn as much as you can from the course, I want you to attend lecture and discussion. Attendance will be taken and counts towards participation in section, and I'll post quizzes in class during the lecture.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class.

Disabilities

If you have a disability that may affect your academic performance, please let me know that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need. <https://sdrc.ucr.edu>

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here:

https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

Additional Student Support Services

ARC: Academic Resource Center

<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

<https://counseling.ucr.edu>

Requirements

- Quizzes during Lecture (10%)
- First Mid-Term (20%)
- Second Mid-Term (25%)
- Final Exam (35%)
- Discussion Section: Attendance and Participation (10%)

Grading Scale

97-100 A+

93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

There will be no rounding up of points.

Textbook

José Luis Bermúdez (2023). *Cognitive Science: An Introduction to the Science of the Mind*. Fourth Edition. Cambridge University Press.

Schedule

Week One

The Prehistory of Cognitive Science – Behaviorism, Algorithms, Syntax, Information-Processing

Bermudez, Introduction, Ch 1.

Chomsky, N. (1959) A review of B.F. Skinner's *Verbal Behavior*. *Language* 35: 26-58.

Week Two

The Discipline Matures – Language, Mental Images, Marr's Theory of Vision

Bermudez, Ch 2

Marr, D. (1977) Artificial Intelligence—A Personal View. *Artificial Intelligence* 9: 37-48.

Week Three

The Turn to the Brain

Bermudez, Ch 3

Mishkin, M.L., Ungerleider, G., & Macko, K.A. (1983/2001). Object Vision and Spatial Vision: Two Cortical Pathways. *Trends in Neurosciences* 6: 414-17.

First Midterm, End of Week Three

Week Four

Physical Symbol Systems and the Language of Thought

Bermudez, Ch 4

Block, N. (1995). The Mind as Software of the Brain. In Osherson, et. al., *An Invitation to Cognitive Science*. The MIT Press. First two sections only.

Newell, A. & Simon, H.A. (1976). Computer Science as Empirical Inquiry: Symbols and Search. *Communications of ACM* 19: 113-126.
Searle, J. (1990). Is the Mind a Digital Computer? *Proceedings of the American Philosophical Association* 64: 21-37.

Week Five

Neural Networks and Distributed Information Processing

Bermudez, Ch 5

Week Six

Bayesianism in Cognitive Science

Bermudez, Ch 7

Second Midterm, End of Week Six

Week Seven

Modules and Architectures

Bermudez, Ch 8

Fodor, J. (1985). *Precis of The Modularity of Mind. Behavioral and Brain Sciences* 1: 1-5.
Cosmides, L. & Tooby, J. (1991). Reasoning and Natural Selection. R. Dulbecco (ed.) *Encyclopedia of Human Biology* 6: 493-503.

Week Eight

Machine Learning: From Expert Systems to Deep Learning

Bermudez, Ch 10

Lecun, Y., Bengio, A., & Hinton, G. (2015). *Deep Learning*. *Nature* 521: 436.

Week Nine

The Cognitive Science of Consciousness

Bermudez, Ch 15

Milner, A.D. & Goodale, M.A. (2008). Two Visual Systems Reviewed. *Neuropsychologia* 46: 774-786.
Block, N. (1995). On a Confusion about a Function of Consciousness. *Behavioral and Brain Sciences* 18: 227-47.

Week Ten

Looking Ahead: Challenges and Opportunities

Bermudez, Ch 17

Final Exam, Finals Week

CGIS 100

Fundamental Approaches and Applications

INSTRUCTOR
MEETING ROOM & TIMES
OFFICE HOURS

Catalog Description

CGIS 100 Fundamental Approaches and Applications 4. Lecture, 3 hours. Discussion, 1 hour. Advanced introduction to fundamental approaches to cognitive and information science. Topics include mental architecture, computation, information-processing, artificial intelligence, connectionism, neural networks, robotics, embodied cognition, with applications to various cognitive capacities, including perception, language, memory, reasoning, mind-reading, and decision-making. *Prerequisite(s): CGIS 001; CS 009A or CS 042; CS 011 / MATH 011 or PHIL 008 or PHIL 008H.*

Course Description

This course develops an interdisciplinary review of the fundamentals of cognitive and information science, exploring how minds represent and process information. Students will examine major theoretical frameworks, including computationalism, connectionism, dynamical systems, and embodied cognition, and their applications to cognitive capacities such as perception, language, memory, and decision-making. Through lectures and discussions, the course integrates insights from philosophy, psychology, neuroscience, artificial intelligence, and linguistics. Emphasis is placed on both foundational theories and contemporary empirical research, fostering a critical understanding of how cognitive processes are modeled and studied.

Learning Goals

The primary goal of this course is to acquaint you with some of the fundamental theoretical approaches in cognitive science and how those approaches account for various cognitive abilities, including perception, object permanence, language acquisition and language use, mindreading, amongst other abilities. The approaches include the computational theory of the mind, connectionism, dynamical systems, and embodied approaches.

- (6) Identity the problems that cognitive and information science addresses.
- (7) Articulate the fundamental assumptions of CGIS.
- (8) Describe the major empirical and theoretical insights CGIS offers into understanding various mental processes.
- (9) Describe how the various component disciplines contribute to CGIS.
- (10) Describe the various empirical approaches CGIS uses to discover how minds work.

Resources

The required textbook is José Luis Bermúdez, *Cognitive Science: An Introduction to the Science of the Mind*, Fourth Edition (Cambridge University Press, 2023). It is available through the bookstore and elsewhere. There are a number of other readings that will be made available on iLearn.

iLearn will function as an information hub for the course, and will contain a variety of important resources such as assignment instructions and lecture slides, so please make sure to check it regularly. Also, I will often use iLearn to make important announcements about the course, so make sure that your iLearn notifications are set up appropriately.

Attendance

The number one predictor of grades in college classes is attendance. And since grades are correlated with learning, and since I want you to learn as much as you can from the course, I want you to attend lecture and discussion. Attendance will be taken and counts towards participation in section, and I'll post quizzes in class during lecture.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class.

Disabilities

If you have a disability that may affect your academic performance, please let me know that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need. <https://sdrc.ucr.edu>

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here:

https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

Additional Student Support Services

ARC: Academic Resource Center

<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

<https://counseling.ucr.edu>

Requirements

- Quizzes during Lecture (10%)
- First Mid-Term (20%)
- Second Mid-Term (25%)
- Final Exam (35%)
- Discussion Section: Attendance and Participation (10%)

Grading Scale

97-100	A+
93-96.99	A
90-92.99	A-

87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

There will be no rounding up of points.

Textbook

José Luis Bermúdez (2023). *Cognitive Science: An Introduction to the Science of the Mind*. Fourth Edition. Cambridge University Press. Additional readings to be provided on Canvas.

Schedule

Week One

The Language of Thought

Bermudez, Introduction, Ch 4

Crane, T. (2015). *The Mechanical Mind*, Third Edition. Routledge Press. Selections.

Rescorla, M. (2013). The Language of Thought Hypothesis. Stanford Encyclopedia of Philosophy.

Week Two

Neural Networks

Bermudez, Ch 5

Pinker, S. & Prince, A. (1988). Rules and Connections in Human Language. In R. Morris (ed.) *Parallel Distributed Processing*. Oxford University Press.

McLeod, P., Plunkett, K., & Rolls, E. (1998) *Introduction to the Connectionist Modeling of Cognitive Processes*. Oxford University Press. pp. 210-219.

Week Three

Dynamical Systems

Bermudez, Ch 6

Beer, R.D. (2000). Dynamical Approaches to Cognitive Science. *Trends in Cognitive Sciences* 4: 91-99.

Smith & Thelen (2003). Development as a Dynamical System. *Trends in Cognitive Sciences* 7: 191-205.

First Midterm. End of Week Three.

Week Four

Bayesianism

Bermudez, Ch 7

Rescorla, M. (2015). Bayesian Perceptual Psychology. In Matthen, M. (ed.) *The Oxford Handbook of the Philosophy of Perception*. Oxford University Press.

Rescorla, M. (2021). Bayesian Modeling of the Mind: From Norm to Neuros. *WIREs Cognitive Science* 12, e1540.

Week Five

Brain Mapping

Bermudez, Ch. 9

Week Six

Models of Language Learning

Bermudez, Ch 10

Pullum, G. & Scholz, B. (2002). Empirical Assessment of Stimulus Poverty Arguments. *The Linguistic Review* 18: 9-50.

Pinker, S. & Ullman, M.T. (2002). The Past and Future of the Past Tense. *Trends in Cognitive Sciences* 6: 456-63.

McClelland, J. L. & Patterson, K. (2002). Rules or Connections in Past-Tense Inflections: What does the Evidence rule Out? *Trends in Cognitive Sciences* 6, 465-72.

Pearl, L. & Goldwater, S. (2016). Statistical Learning, Inductive Bias, and Bayesian Inference in Language Acquisition. In Lidz et. al. (eds.) *The Oxford Handbook of Developmental Linguistics*. Oxford University Press.

Second Midterm. End of Week Six

Week Seven

Object Perception and Folk Physics

Bermudez, Ch 11

Carey, S. & Spelke, E. (1996). Science and Core Knowledge. *Philosophy of Science* 63: 515-33.

Hespos, S.J. & van Marle, K. (2012). Physics for Infants: Characterizing the Origins of Knowledge about Objects, Substances, and Number. *WIREs Cognitive Science* 3: 19-27.

Elman, J. L. (2005). Connectionist Models of Cognitive Development: Where Next? *Trends in Cognitive Sciences* 9: 111-117.

Week Eight

Mindreading

Bermudez, Ch 13

Bloom, P. & German, T. (2000). Two Reasons to Abandon the False Belief Task as a Test of Theory of Mind. *Cognition* 77: B25-B31.

Wellman, H. (2018). Theory of Mind: The State of the Art. *European Journal of Developmental Psychology* 15: 728-55.

Baron-Cohen, S. (2009). The Empathizing-Systematizing (E-S) Theory. *Annals of the New York Academy of Sciences* 1156, 68-80.

Heyes, C. & Catmur, C. (2022). What Happened to Mirror Neurons? *Perspectives on Psychological Science* 17: 153-68.

Phillips et. al. (2021). Knowledge Before Belief. *Behavioral and Brain Sciences* 44: e140.

Weeks Nine and Ten

Robotics and Embodied Cognition

Bermudez, Ch 14

Clark, A. (2011). Précis of Supersizing the Mind: Embodiment, Action, and Cognitive Extension. *Philosophical Studies* 152: 413-6.

- Shapiro, L. (2007). The Embodied Cognition Research Programme. *Philosophy Compass* 2: 338-46.
- Riener, C. & Stefanucci, J. (2014). Perception and/for/with/as action. In Shapiro (ed.) *The Routledge Handbook of Embodied Cognition*. Routledge. 99-107.
- Spaulding, S. (2014). Embodied Cognition and Theory of Mind. In Shapiro (ed.) *The Routledge Handbook of Embodied Cognition*. Routledge. 197-206.

PHIL 136

Philosophy of Biology

INSTRUCTOR

MEETING ROOM & TIMES

OFFICE HOURS

Catalog Description

PHIL 136 Philosophy of Biology 4. Lecture, 3 hours. Additional reading, 3 hours. Examines philosophical issues central to the life sciences. Topics include life, evolutionary theory, fitness, the units of selection, information, genetic and epigenetic inheritance, and the evolution of minds. Prerequisite(s): PHIL 001 or PHIL 006 or PHIL 010 or PHIL 010H or PHIL 114 or PHIL 133 or PHIL 134 or PHIL 135 or PHIL 137 or PHIL 144 AND BIOL 002 or BIOL 003 or BIOL 005A or BIOL 005B or BIOL 005C or BIOL 010 or BIOL 020 or BIOL 030 or BIOL 034.

COURSE DESCRIPTION

This course will explore various conceptual and theoretical questions that arise when we look at the world of active, living organisms through the lens of natural science.

We'll begin by looking at the nature of life itself, and how it might be explained.

Complex living organisms are made from the same physical matter as inorganic objects like rocks or clouds, yet living organisms seem clearly distinct from inorganic objects. How should we understand this distinction?

Appealing to a 'divine spark' or vital essence doesn't really resolve the mystery of how matter could be alive; but can we fully explain the distinctive features of living organisms by conceptualizing them as complex machines?

Second, we'll look at how life forms have changed and diversified over the last 4 billion years of life on Earth. A remarkable feature of the evolution of living organisms is that in many cases they become better adapted to their environments. Darwin's explanation of how this is possible — the theory of natural selection — is one of the most profound and far-reaching insights in all of science. But a lot has changed in biology since 1859. How should we understand evolution in light of modern genetics and molecular biology? Specifically, can we explain evolution purely in terms of shifting gene-frequencies, or does this ignore other important factors that are inherited across generations?

This leads to the third part of the course, where we will focus on the complex causal relations between what an organism inherits and the environment that it inhabits. Biologists say that genes contain 'information', or 'program' the development of organisms. What exactly do they mean by this? Despite regular claims in the media that certain behaviors are 'hard-wired' by genes, few biologists hold that genes alone determine the result of developmental processes. How then should we understand the role of genes in development, and, more broadly, the relation between 'nature' and 'nurture'?

Finally, in the fourth part of the course, we turn to look at the connection between life and mind. Many biological organisms such as plants and bacteria exhibit subtle adaptive behavior, but probably most of us wouldn't go so far as to say that they have minds. Why not? What are the evolutionary origins of the mind? More specifically, how have our specific kinds of minds evolved?

LEARNING OUTCOMES

The questions we'll explore in this course involve a combination of conceptual and empirical issues. To understand whether viruses are alive, for example, we need a clear understanding of what being alive requires, as well as an understanding of whether viruses in fact satisfy these requirements. In taking this class, you will thus learn about some fascinating empirical research into the complexity, development, and evolution of living organisms, as well as some foundational philosophical skills of conceptual clarification and argumentative analysis.

By the end of the course, you will be able to think more carefully and critically about the various claims about biological phenomena that you encounter in your everyday life, such as sensational claims in the media that certain behaviors are 'hard-wired' by genes. This will help you to be a more discerning consumer of scientific information. Moreover, the critical thinking skills you'll develop in this course will be of use not just in biological contexts, but in any domain in which it is important to reason carefully about complex issues.

STUDENT RESPONSIBILITIES

Participation

This course requires your active participation. Please come to class ready to discuss readings, share relevant experiences, and respectfully engage with what others have to say. Because of the importance of participation in this course, you are expected to attend every session, and attendance will be recorded. You are allowed two unexplained absences without penalty; any absences after that will affect the participation component of your grade.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class. We will decide on a policy for laptop use together on the first day of class.

Disabilities

If you have a disability that may affect your academic performance, please let me know and make sure that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need.

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here:

https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

RESOURCES

You are not required to purchase a textbook for this course, as all readings (and other resources) will be made available on iLearn. Please read the required readings in the order listed, and at least skim the optional readings if you have time. We'll be reading several selections from a textbook entitled *Sex and Death* by Kim Sterelny and Paul Griffiths (University of Chicago Press, 1999). If you'd like further background on some of the issues we'll be discussing, or an introduction to issues in philosophy of biology that we won't have time to discuss, I highly recommend that you pick up a copy. Another excellent philosophy of biology textbook that I highly recommend is *Philosophy of Biology* by Peter Godfrey-Smith (Princeton University Press, 2014).

iLearn will function as an information hub for the course, and will contain a variety of

important resources such as assignment instructions and lecture slides, so please make sure to check it regularly. Also, I will often use iLearn to make important announcements about the course, so make sure that your iLearn notifications are set up appropriately.

REQUIREMENTS

Discussion board posts (16%)

You are required to make a total of six posts to the course discussion board on iLearn. The purpose of these posts is to demonstrate that you have read and thought carefully about the reading materials, and to provide a springboard for class discussions. Your posts should address one of the readings assigned for a given week and, in roughly half a page, should address the following: What is the central point (or points) the author is trying to make in this text? What are the central claims the author uses to support these points? What did you find most confusing or questionable about how the author used these claims to support his/her point, and why?

Alternatively, your post may reply to another student's post, in which case you should try to answer the student's question, citing any evidence or reasons that you think are relevant and reliable. If your post draws from any specific scientific or philosophical research, make sure to provide complete references. To receive credit for your post, you must submit it by 11pm on Wednesday (starting the second week of class), so we can discuss it during class on Thursday. Aside from the required discussion board posts, you are encouraged to submit additional posts, which will contribute to the 'Participation' component of your grade.

Argumentative paper (34%)

You will be required to write a 7-8 page paper which develops an argument for a specific thesis on a topic of your choice. You will be required to submit a draft approximately two weeks before the final deadline, and the papers will then go through a process of peer review. You will submit a final copy of your paper on the last day of class. Paper topics and instructions will be made available in a separate handout.

Short writing assignments (20%)

You will be required to complete a total of four short writing-based assignments, each focusing on a specific skill that will help you write your argumentative paper. The exercises will be assigned in class and will vary from week to week. Each will be the equivalent of about 2 pages of writing.

Group research project & presentation (20%)

You will research a given topic with 2-3 other students, write up an annotated bibliography on your topic, and present your research to the class in a 20-30 minute presentation. Presentations will be held on Thursday class in the latter half of the semester.

Attendance and Participation (10%)

You will be graded on the extent to which you are an active and engaged participant in the course based on your attendance, contributions in class & on the discussion board, discussions with me during office hours, and so forth.

GRADING SCALE

97-100 A+

93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

STUDENT SUPPORT SERVICES

ARC: Academic Resource Center

<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

<https://counseling.ucr.edu>

SDRC: Student Disability Resource Center

<https://sdrc.ucr.edu>

UCR Education Abroad

<https://international.ucr.edu/abroad>

UC Education Abroad Program

<https://uceap.universityofcalifornia.edu>

SCHEDULE

This schedule might change over the quarter, depending on the pace at which we move through the material and the interests of the participants. Any changes will be announced on iLearn.

PART I: LIFE

WEEK 1: INTRODUCTION

Required:

Godfrey-Smith, P. (2014). *Philosophy of Biology* (Princeton University Press). (Ch.1)

Bedau, M. A. (2008). What is Life? In M. Ruse (Ed.), *The Oxford Handbook of Philosophy of Biology* (pp. 191–210). Oxford University Press.

Ramsey, W. (1992). Prototypes and Conceptual Analysis. *Topoi*, 11(1), 59–70.

Optional:

Cleland, C. E., & Chyba, C. F. (2002). Defining ‘Life’. *Origins of Life and Evolution of the Biosphere*, 32(4), 387–393.

WEEK 2: EXPLAINING LIFE: VITALISM VS. MECHANISM

Required:

Bechtel, W. (2013). Addressing the Vitalist's Challenge to Mechanistic Science. In S. Normandin & C. T. Wolfe (Eds.), *Vitalism and the Scientific Image in Post-Enlightenment Life Science, 1800–2010* (pp. 7–22). Springer.

Bada, J. L. (2004). How Life Began on Earth: A Status Report. *Earth and Planetary Science Letters*, 226(1–2), 1–15.

Optional:

Weber, B. H. (2015). Life. In *Stanford Encyclopedia of Philosophy* (Fall 2015 Edition). <http://plato.stanford.edu/entries/life/>

Vasas, V., Szathmáry, E., & Santos, M. (2010). Lack of Evolvability in Self-Sustaining Autocatalytic Networks: Constraints Metabolism-First Scenarios for the Origin of Life. *Proceedings of the National Academy of Sciences*, 107(4), 1470–1475.

WEEK 3: EXPLAINING LIFE: ORGANISMS & ORGANIZED COMPLEXITY

Required:

Mossio, M., & Moreno, A. (2010). Organizational Closure in Biological Organisms. *History and Philosophy of the Life Sciences*, 32(2–3), 269–288.

Nicholson, D. J. (2013). Organisms ≠ Machines. *Studies in History and Philosophy of Biological and Biomedical Sciences*, 44(4), 669–678.

Optional:

Bechtel, W. (2007). Biological Mechanisms: Organized to Maintain Autonomy. *Synthese*, 155(1), 123–139.

PART II: EVOLUTION

WEEK 4: THE BIG PICTURE: CHANGE, VARIATION, ... PROGRESS?

Required:

Gould, S. J. (1989). *Wonderful Life: The Burgess Shale and the Nature of History*. W. W. Norton & Company. (Ch.1)

Sterelny, K., & Griffiths, P. E. (1999). *Sex and Death: An Introduction to Philosophy of Biology*. University of Chicago Press. (Ch. 12)

Optional:

Szathmáry, E., & Maynard Smith, J. (1995). The Major Evolutionary Transitions. *Nature*, 374(6519), 227–232.

Sterelny, K., & Griffiths, P. E. (1999). *Sex and Death: An Introduction to Philosophy of Biology*. University of Chicago Press. (Ch. 2)

WEEK 5: WHAT GETS SELECTED?

Required:

Okasha, S. (2006). *Evolution and the Levels of Selection*. Oxford University Press.

Optional:

Sterelny, K., & Griffiths, P. E. (1999). *Sex and Death: An Introduction to Philosophy of Biology*. University of Chicago Press. (Ch. 3)

Sterelny, K., & Griffiths, P. E. (1999). *Sex and Death: An Introduction to Philosophy of Biology*. University of Chicago Press. (Ch. 4)

PART III: INHERITANCE & DEVELOPMENT

WEEK 6: WHAT ARE GENES ANYWAY?! THE GENE CONCEPT

Required:

Stotz, K., Griffiths, P. E., & Knight, R. (2004). How Biologists Conceptualize Genes: An Empirical Study. *Studies in History and Philosophy of Biological and Biomedical Sciences*, 35(4), 647–673.

Barry, P. (2007). Genome 2.0. *Scientific American*, 296(3), 44–51.

Optional:

Griffiths, P. E., & Stotz, K. (2007). Gene. In D. L. Hull & M. Ruse (Eds.), *The Cambridge Companion to the Philosophy of Biology* (pp. 85–102). Cambridge University Press.

WEEK 7: GENETIC INFORMATION

Required:

Shea, N. (2007). Representation in the Genome and in Other Inheritance Systems. *Biology and Philosophy*, 22(3), 313–331.

Levy, A. (2011). Information in Biology: A Fictionalist Account. *Noûs*, 45(4), 640–657.

Optional:

Shea, N. (2011). Developmental Systems Theory Formulated as a Claim about Inherited Representations. *Philosophy of Science*, 78(1), 60–82.

WEEK 8: NATURE & NURTURE: INNATENESS

Required:

Garson, J. (2015). *The Biological Mind: A Philosophical Introduction*. Routledge. (Ch. 4)

van den Hurk, J., et al. (2017). Development of Visual Category Selectivity in Ventral Visual Cortex Does Not Require Visual Experience. *Proceedings of the National Academy of Sciences*, 114(22), E4501–E4510.

Optional:

Spencer, J. P., Blumberg, M. S., McMurray, B., Robinson, S. R., Samuelson, L. K., & Tomblin, J. B. (2009). Short Arms and Talking Eggs: Why We Should No Longer Abide the Nativist-Empiricist Debate. *Child Development Perspectives*, 3(2), 79–87.

PART IV: LIFE & MIND

WEEK 9: THE EMERGENCE OF MIND: ADAPTIVE BEHAVIOR & MINIMAL COGNITION

Required:

Moreno, A., & Lasa, A. (2003). From Basic Adaptivity to Early Mind: A Biosemiotic Perspective. *Biosemiotics*, 2(1), 17–37.

Trestman, M. (2013). The Cambrian Explosion and the Origins of Embodied Cognition. *Biological Theory*, 8(1), 80–92.

WEEK 10: THE EVOLUTION OF HUMAN COGNITION

Required:

Sterelny, K. (2013), M. (2013). The Informational Commonwealth. Arguing About Human Nature: Contemporary Debates. Routledge, Taylor & Grancis. 274-288.

PHIL 148

Philosophy of Information

INSTRUCTOR

MEETING ROOM & TIMES

OFFICE HOURS

Catalog Description

PHIL 148 Philosophy of Information 4. Lecture, 3 hours. Additional reading, 3 hours. Examines key issues in the philosophy of information, including theories of semantic and naturalistic information, informational ontologies, and the intersections of logic, computation, and cognition. Topics include informational pluralism, structural realism, digital ontology, semantic content, and the use of information in cognitive science and the biological sciences. *Prerequisite(s): CGIS 100 and PHIL 124.*

Course Description

This course is designed to familiarize the scholar with the philosophy of information, the informational turn(s) in philosophy and logic, and various topics in the logic of information and informational logic (and the reason for the distinction), the metaphysics of information, and the metametaphysics of information. Significant attention will be given to the juxtaposition of pluralism about the nature of information and unificatory conceptions of information, the reasons for the wide variety of different conceptions information to non-informational and traditional metaphysical theories and positions. of the nature of information, and the relationship of informational ontologies and ontologies of information.

Learning Outcomes

- Demonstrate philosophical acumen about the philosophy of information, the relationship between information and logic (in both ontic ‘directions’), and the metaphysics and metametaphysics of information (especially regarding realism and avoiding conceptual and definitional circularity.)
- Demonstrate understanding of pluralism about information
- Understand the relationship between pluralism and Ur-conceptions of information
- Have ability to produce coherent philosophical argumentation about various theories of information and the nature of information across objectivist, probabilist, subjectivist, cognitivist, logicist, mathematized, and structuralist conceptions.
- Demonstrate research skills specific to the informational turn and the philosophy of information in general
- Assess the appropriateness of various conceptions of the nature of information – especially naturalistic conceptions - in various settings including the philosophy of biology and cognitive science.

STUDENT RESPONSIBILITIES

Participation

This course requires your active participation. Please come to class ready to discuss readings, share relevant experiences, and respectfully engage with what others have to say. Because of the importance of participation in this course, you are expected to attend every session, and attendance will be recorded. You are allowed two unexplained absences without penalty; any absences after that will affect the participation component of your grade.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class. We will decide on a policy for laptop use together on the first day of class.

Disabilities

If you have a disability that may affect your academic performance, please let me know and make sure that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need.

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here:

https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

RESOURCES

You are not required to purchase a textbook for this course, as all readings (and other resources) will be made available on iLearn. Please read the required readings in the order listed, and at least skim the optional readings if you have time.

iLearn will function as an information hub for the course, and will contain a variety of important resources such as assignment instructions and lecture slides, so please make sure to check it regularly. Also, I will often use iLearn to make important announcements about the course, so make sure that your iLearn notifications are set up appropriately.

REQUIREMENTS

Discussion board posts (15%)

You are required to make a total of six posts to the course discussion board on iLearn. The purpose of these posts is to demonstrate that you have read and thought carefully about the reading materials, and to provide a springboard for class discussions. Your posts should address one of the readings assigned for a given week and, in roughly half a page, should address the following: What is the central point (or points) the author is trying to make in this text? What are the central claims the author uses to support these points? What did you find most confusing or questionable about how the author used these claims to support his/her point, and why?

Alternatively, your post may reply to another student's post, in which case you should try to answer the student's question, citing any evidence or reasons that you think are relevant and reliable. If your post draws from any specific scientific or philosophical research, make sure to provide complete references. To receive credit for your post, you must submit it by 11pm on Wednesday (starting the second week of class), so we can discuss it during class on Thursday.

Aside from the required discussion board posts, you are encouraged to submit additional posts, which will contribute to the 'Participation' component of your grade.

Argumentative paper (35%)

You will be required to write a 7-8 page paper which develops an argument for a specific thesis on a topic of your choice. You will be required to submit a draft approximately two weeks before the final deadline, and the papers will then go through a process of peer review. You will submit a final copy of your paper on the last day of class. Paper topics and instructions will be made available in a separate handout.

Short writing assignments (20%)

You will be required to complete a total of four short writing-based assignments, each focusing on a specific skill that will help you write your argumentative paper. The exercises will be assigned in class and will vary from week to week. Each will be the equivalent of about 2 pages of writing.

Group research project & presentation (20%)

You will research a given topic with 2-3 other students, write up an annotated bibliography on your topic, and present your research to the class in a 20-30 minute presentation. Presentations will be held on Thursday class in the latter half of the semester.

Attendance and Participation (10%)

You will be graded on the extent to which you are an active and engaged participant in the course based on your attendance, contributions in class & on the discussion board, discussions with me during office hours, and so forth.

GRADING SCALE

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

Schedule

Week One

The Informational Turn – Philosophy

Floridi, L. (2011). What is the philosophy of information? Oxford University Press.

Floridi, L. (2010). The philosophy of information: Ten years later. Metaphilosophy.
<https://doi.org/10.1111/j.1467-9973.2010.01647.x>

Optional. Adams, F. (2003). The Informational Turn in Philosophy. In Minds and Machines.
<https://doi.org/10.1023/A:1026244616112>

Week Two

The Informational Turn – Logic

Floridi, L. (2006). The logic of being informed. Logique et Analyse.
<https://doi.org/10.1093/acprof:oso/9780199232383.003.0010>

Van Benthem, J. (2003). Logic and the Dynamics of Information. Minds and Machines.
<https://doi.org/10.1023/A:1026296600182>

Optional. Seligman, J., & Moss, L. S. (2011). Situation Theory. In Handbook of Logic and Language. <https://doi.org/10.1016/B978-0-444-53726-3.00004-9>

Week Three

The Nature of Information and Naturalizing Information

Adriaans, P. (2010). A Critical Analysis of Floridi's Theory of Semantic Information. Knowledge, Technology & Policy. <https://doi.org/10.1007/s12130-010-9097-5>

Dretske, F. I. (1983). Précis of Knowledge and the Flow of Information. Behavioral and Brain Sciences.
<https://doi.org/10.1017/S0140525X00014631>

Optional. Floridi, L. (2009). Against digital ontology. Synthese. <https://doi.org/10.1007/s11229-008-9334-6>

Week Four

Metaphysics and Metametaphysics of Information I

Floridi, L. (2009). Against digital ontology. Synthese. <https://doi.org/10.1007/s11229-008-9334-6>

Timpson, C. G. (2013). What is Information? Oxford University Press.

Floridi, L. (2008). A defense of informational structural realism. Synthese.
<https://doi.org/10.1007/s11229-007-9163-z>

Optional. Long, B. (2018). ISR is Still a Digital Ontology. Erkenntnis.
<https://doi.org/10.1007/s10670-018-0041-5>

Week Five

Metaphysics and Metametaphysics of Information II

Lombardi, O., Holik, F., & Vanni, L. (2016). What is Shannon information? Synthese.
<https://doi.org/10.1007/s11229-015-0824-z>

Stegmann, U. (2015). Prospects for Probabilistic Theories of Natural Information. Erkenntnis, 80(4), 869–893. <https://doi.org/10.1007/s10670-014-9679-9>

Optional. Cohen, J., & Meskin, A. (2006). An objective counterfactual theory of information. Australasian Journal of Philosophy. <https://doi.org/10.1080/00048400600895821>

Week Six

Metaphysics and Metametaphysics of Information III

Collier, J. (1996). Information originates in symmetry breaking. Symmetry: Science and Culture.

Liqian, Z., & Brier, S. (2015). The Metaphysics of Chinese Information Philosophy. Cybernetics & Human Knowing.

Optional. Wu, K. (2015). The development of philosophy and its fundamental informational turn. Information (Switzerland). <https://doi.org/10.3390/info6040693>

Week Seven

Theories of Semantic Information

Bar-hillel, Y., & Carnap, R. (1953). Semantic information. British Journal for the Philosophy of Science.
<https://doi.org/10.1093/bjps/IV.14.147>

Floridi, L. (2004). Outline of a Theory of Strongly Semantic Information. Minds and Machines.
<https://doi.org/10.1023/B:MIND.0000021684.50925.c9>

Week Eight

Conceptions and theories of information dynamics: flow, encoding, and processing

Barbieri, M. (2016). What is information? In Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences. <https://doi.org/10.1098/rsta.2015.0060>

Dennett, D. C. (2013). Real Patterns. In Emergence.
<https://doi.org/10.7551/mitpress/9780262026215.003.0011>

Optional. Seligman, J. (2009). Channels: From logic to probability. Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). https://doi.org/10.1007/978-3-642-00659-3_8

Week Nine

Information and Cognitive Science I

Fallon, F. (2018). Integrated information theory. In The Routledge Handbook of Consciousness. <https://doi.org/10.4324/9781315676982>

Lombardi, O., & López, C. (2018). What does “information” mean in integrated information theory? Entropy. <https://doi.org/10.3390/e20120894>

Week Ten

Information and Cognitive Science II

Dretske, F. (1993). Conscious experience. Mind. <https://doi.org/10.1093/mind/102.406.263>

Dretske, F. (2004). Mental causation. Think. <https://doi.org/10.1017/s1477175600000750>

Optional Topics and Readings

Informational Systems theory: Teleonomic theories

Deacon, T. W. (2014). What is missing from theories of information? In Information and the Nature of Reality. <https://doi.org/10.1017/CBO9781107589056.011>

Chang, A. Y. C., Biehl, M., Yu, Y., & Kanai, R. (2019). Information Closure Theory of Consciousness. <http://arxiv.org/abs/1909.13045>

Philosophy of Information in Biology

Collier, J. (2008). Information in Biological Systems. In Philosophy of Information. <https://doi.org/10.1016/B978-0-444-51726-5.50024-8>

Shea, N. (2007). Consumers Need Information: Supplementing Teleosemantics with an Input Condition. Philosophy and Phenomenological Research. <https://doi.org/10.1111/j.1933-1592.2007.00082.x>

Jablonka, E. (2002). Information: Its Interpretation, Its Inheritance, and Its Sharing. Philosophy of Science. <https://doi.org/10.1086/344621>

Consciousness, Panpsychism, and Neutral Monism

Koch, C. (2009). The relationship between integrated information theory and the neuronal correlates of consciousness. Neuroscience Research.

<https://doi.org/10.1016/j.neures.2009.09.1650>

Mindt, G. (2017). The problem with the ‘information’ in integrated information theory. Journal of Consciousness Studies.

Stanford Encyclopedia of Philosophy Entries

Information: <https://plato.stanford.edu/entries/information/>

Semantic Conceptions of Information: <https://plato.stanford.edu/entries/information-semantic/>

Logic and Information: <https://plato.stanford.edu/entries/logic-information/>

STUDENT SUPPORT SERVICES

ARC: Academic Resource Center

<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

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SDRC: Student Disability Resource Center

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UCR Education Abroad

<https://international.ucr.edu/abroad>

UC Education Abroad Program

<https://uceap.universityofcalifornia.edu>

PHIL 146

Philosophy of Computer Science and Artificial Intelligence

INSTRUCTOR
MEETING ROOM & TIMES
OFFICE HOURS

Catalog Description

PHIL 146 Philosophy of Computer Science 4. Lecture, 3 hours. Extra reading, 3 hours. An advanced introduction to the Philosophy of Computer Science and Artificial Intelligence. Topics include philosophy of science, the nature of computer science, computation, computer programs, artificial intelligence, and computer ethics. Prerequisites: *Prerequisite(s): CGIS 100 and PHIL 124.*

Course Description

This course is an advanced introduction to the philosophy of computer science. We will begin with an overview of philosophy and the philosophy of science. We then turn to our science: computer science. The course addresses four large questions from a philosophical point of view: What is computer science? What is a computer program? What is computer ethics? In asking these questions, the course addresses several sub questions: What is computer science a science of? Computers? Computation? Computations are said to be algorithms, and those are said to be procedures or recipes. So what are those? What are Church and Turing's famous theses about computation? What is hypercomputation? And what about programs? What is the relation of a program to that which it models or simulates? What is a simulation? Are programs (scientific) theories? What is an implementation of a program? What is software? What is the relation of computation to cognition?

Learning Goals

Upon successful completion of this course, students will have developed skills that contribute to success in fields such as software engineering, artificial intelligence, human-computer interaction, and data science. These include:

- Ethical Reasoning: Ability to anticipate and assess the societal and moral implications of technological decisions.
- Critical Thinking: Capacity to approach complex problems from multiple perspectives and recognize underlying assumptions.
- Conceptual Clarity: Skill in defining and interrogating foundational terms such as “algorithm,” “simulation,” and “intelligence.”
- Interdisciplinary Communication: Facility with explaining abstract concepts to both technical and non-technical audiences.
- Philosophical Agility: A broader intellectual flexibility that supports innovative thinking in AI design, systems analysis, and policy development.

Textbook

The required textbook is William Rapaport, *Philosophy of Computer Science: An Introduction to the Issues and the Literature* (Wiley Blackwell, 2023). It is available through the bookstore and elsewhere.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class.

Disabilities

If you have a disability that may affect your academic performance, please let me know that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need.

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here:

https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

Requirements

Participation (10%)

Weekly Quizzes (10%)

Response Papers (10%)

Weekly, due Tuesday or Thursday.

Midterm (20%)

In class, short essays.

Final Exam (30%)

During finals week, short essays.

Term Paper (20%)

Due, second to last Friday of the term.

Grading Scale

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-

67-69.99 D+
63-66.99 D
60-62.99 D-

Schedule

Week One

What is Computer Science? What is Science?

Rapaport, Chs 3 & 4

Week Two

Engineering and a Brief History of Computers

Rapaport, Chs 5 & 6

Week Three

Algorithms & Computability

Rapaport, Ch 7

Week Four

Turing's Analysis of Computation and a Philosophical Perspective

Rapaport, Chs 8 & 9

Week Five

The Church-Turing Computability Thesis

Rapaport, Chs 10 & 11

****Midterm, Week Five****

Week Six

Software & Hardware

Rapaport, Ch 12

Week Seven

Implementation

Rapaport, Ch 13

Week Eight

Computer Programs as Scientific Theories

Rapaport, Ch 14

Week Nine

Programs and the World

Rapaport, Ch 16

Week Ten

Computer Ethics: Should We Trust Computers?

Rapaport, Chs 17 & 20

Student Support Services

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<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

<https://counseling.ucr.edu>

SDRC: Student Disability Resource Center

<https://sdrc.ucr.edu>

Education Abroad

<https://international.ucr.edu/abroad>

PHIL 147

Pragmatics

Instructor:
Class Meeting Info:
Office Hours:
Instructor Office:
Instructor Email:

Catalog Description

PHIL 147 Pragmatics 4. Lecture, 3 hours. Additional Reading, 3 hours. An introduction to the study of language use in context. Topics include implicature, presupposition, speech acts, relevance theory, and the semantics-pragmatics interface. Emphasis on theoretical frameworks and empirical data from linguistics, philosophy of language, and cognitive science.

Prerequisite(s): CS 011 / MATH 011 or LING 02 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 107 or PHIL 130 or PHIL 132.

Course Description

This interdisciplinary course explores major theoretical and empirical issues in pragmatics, the study of language in context. You will examine foundational concepts such as implicature, presupposition, and speech acts, while also exploring their cognitive, social, and cross-linguistic dimensions. Drawing on key findings from linguistics, philosophy, and cognitive science, we critically analyze how speakers use and interpret meaning beyond literal semantics.

Learning Outcomes

- Analyze data using core pragmatic concepts.
- Distinguish among competing theories such as Gricean Pragmatics and Relevance Theory.
- Connect pragmatic phenomena to cognitive and cultural dimensions of language use.
- Apply pragmatic theory of real-world and cross-linguistic data.

Texts

- Required: Huang, Yan. *Pragmatics* (2nd ed., Oxford University Press, 2014)

Assignments

- | | |
|--|-----|
| • Weekly Reading Responses and Quizzes | 20% |
| • Problem Sets and Exercises | 20% |
| • Midterm Exam | 20% |

- Final Exam 20%
- Research Paper 20%

Notes on Assignments

- All readings must be completed before the class for which they are assigned
- Final paper topics must be approved by the end of Week 7.
- The Final Exam will be held on the date and time provided by the Registrar.
- The Final Paper will be due on the first day of Finals Week.

Grading Scale

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

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- Counseling and Psychological Services: <https://counseling.ucr.edu> 951-827-5531

Plagiarism and Academic Integrity

Students in this course are expected to uphold the highest standards of academic integrity, in line with the UC Riverside Academic Integrity Policy. Plagiarism—defined as presenting someone else's words, ideas, data, or work as your own without proper

citation—is strictly prohibited. Consequences may include a failing grade on the assignment and/or a failing grade in the course, along with referral to the Office of Student Conduct. Other forms of cheating or violations of the Academic Integrity policy are also prohibited.

WEEKLY SCHEDULE

Week 1: Introduction to Pragmatics

- Readings: Chapter 1, pp. 1–23 (*What is Pragmatics?*; history; basic notions).
- Topics: Definitions of pragmatics, historical roots, Anglo-American vs. Continental traditions.
- Activities: Discussion and examples; key concepts review.
- Assignments: Reading response and quiz.

Week 2: Implicature I – Gricean Framework

- Readings: Chapter 2, pp. 27–43 (Grice’s cooperative principle and maxims).
- Topics: Non-natural meaning, implicature, maxims of conversation.
- Activities: Analyze conversational examples.
- Assignments: Problem Set 1 due; reading response and quiz.

Week 3: Implicature II – Neo-Gricean Theories

- Readings: Chapter 2, pp. 43–78 (Hornian and Levinsonian systems; properties of implicature).
- Topics: Neo-Gricean approaches; generalized vs. particularized implicature.
- Activities: Compare Gricean and Neo-Gricean frameworks.
- Assignments: Reading response and quiz.

Week 4: Implicature III – Debates and Conventional Implicature

- Readings: Chapter 2, pp. 66–83 (current debates, embedded implicature, conventional implicature).
- Topics: Conventional vs. conversational implicature; embedded cases.
- Activities: Apply tests to sample data.
- Assignments: Problem Set 2 due; reading response and quiz.

Week 5: Presupposition I

- Readings: Chapter 3, pp. 84–97 (phenomena, representative examples, properties).
- Topics: Constancy under negation, defeasibility, projection problem.
- Activities: Presupposition diagnostics exercises.
- Assignments: Reading response and quiz.
- Midterm Exam this week.

Week 6: Presupposition II – Analyses

- Readings: Chapter 3, pp. 97–117 (filtering-satisfaction, cancellation, accommodation).
- Topics: Major analyses of presupposition; accommodation in discourse.

- Activities: Evaluate competing theories.
- Assignments: Problem Set 3 due; reading response and quiz.

Week 7: Speech Acts I

- Readings: Chapter 4, pp. 118–135 (Austin, Searle, performatives, felicity conditions).
- Topics: Performative/constative, felicity conditions, illocutionary types.
- Activities: Apply felicity tests to examples.
- Assignments: Reading response and quiz.
- Final Paper topic proposal due end of week.

Week 8: Speech Acts II – Indirectness and Culture

- Readings: Chapter 4, pp. 135–168 (indirect speech acts, politeness/impoliteness, cross-cultural perspectives).
- Topics: Indirectness, politeness theory, variation across languages.
- Activities: Cross-cultural case studies.
- Assignments: Problem Set 4 due; reading response and quiz.

Week 9: Relevance Theory

- Readings: Chapter 7, pp. 267–293 (cognitive and communicative principles; explicature; r-implicature).
- Topics: Sperber & Wilson’s framework; pragmatics as theory of mind.
- Activities: Apply relevance theory to text and dialogue analysis.
- Assignments: Reading response and quiz.

Week 10: Semantics–Pragmatics Interface

- Readings: Chapter 8, pp. 297–337 (context-dependence, pragmatic intrusion, analyses of “what is said”).
- Topics: Contextualism vs. minimalism; explicature vs. implicature.
- Activities: Student presentations on research paper progress.
- Assignments: Reading response and quiz.

Finals

- Final Exam during Finals Week.
- Final Research Paper due first day of Finals Week.

PHIL 170

Ethics of Artificial Intelligence

Instructor
Office Hours
Office
Email
Meeting Room
Meeting Times

Catalog Description

PHIL 170 Ethics of Artificial Intelligence 4. Lecture, 3 hours. Additional Reading, 3 hours. Examines the ethics of artificial intelligence, including algorithmic bias, rights of AI entities, and societal impacts. *Prerequisites: Upper-division standing.*

Course Description

This course explores the ethical dimensions of artificial intelligence through the lens of philosophical reasoning and interdisciplinary analysis. We will investigate topics such as algorithmic bias, autonomous systems, moral responsibility, rights of AI entities, and the societal impacts of machine learning and robotics. The course is designed for students considering careers in AI, data science, policy, and related interdisciplinary fields.

Learning Goals

- Understand key ethical theories and frameworks relevant to the design and deployment of AI systems.
- Analyze real-world AI applications using philosophical and interdisciplinary perspectives.
- Evaluate the moral and social implications of AI in various sectors (e.g., healthcare, military, justice).
- Create well-structured arguments and policy recommendations concerning AI ethics.
- Apply ethical reasoning in professional contexts, particularly in AI development, regulation, and design.
- Communicate clearly and persuasively across disciplinary boundaries on issues involving ethical AI.

Required Texts

Primary: Liao, S. Matthew (ed.). *Ethics of Artificial Intelligence* (Oxford University Press, 2020).

Supplementary: Dubber, Markus D., et al. (eds.). *The Oxford Handbook of Ethics of AI* (Oxford University Press, 2020).

Course Requirements

- Participation & Weekly Discussions (15%)
- Weekly Response Papers (25%)

- Group Case Analysis Presentation (15%)
- Final Research Paper (30%)
- Ethics-in-Practice Portfolio (15%)

Assignments Overview

- **Weekly Response Papers:** 1–2 pages responding critically to that week’s readings and discussion prompts. Due weekly.
- **Ethics-in-Practice Portfolio:** Curated examples of ethical challenges in AI encountered across real-world applications, with student commentary. Due last day of class.
- **Group Case Study:** In-class presentation on a major ethical case (e.g., COMPAS, facial recognition, Tesla autopilot).
- **Final Paper:** 10–12 pages developing a normative position on an AI ethics issue, integrating philosophical and technical understanding. Due last day of finals week.

Grading Scale

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

Weekly Schedule

Week	Topic	Readings (Liao)	Supplemental (Oxford Handbook)
Week 1	Introduction to AI Ethics	Ch. 1 – Introduction	Ch. 1 Bryson, Ch. 2 Powers & Ganascia
Week 2	Bias, Fairness & Justice	Ch. 2 – Machine Bias	Ch. 8 Le Bui & Noble, Ch. 13 Gebru
Week 3	Autonomy and Responsibility	Ch. 3 – Responsibility for AI	Ch. 11 Dignum, Ch. 18 Wheeler

Week 4	Explainability and Transparency	Ch. 4 – The Black Box Problem	Ch. 10 Diakopoulos, Ch. 9 Kroll
Week 5	Trustworthy and Human-Centered AI	Ch. 5 – Value Alignment	Ch. 4 Yeung et al., Ch. 24 Chrisley
Week 6	AI in the Legal System	Ch. 6 – Risk Prediction Tools	Ch. 38 Surden, Ch. 39 Barabas
Week 7	Autonomous Weapons & Military AI	Ch. 9 – Lethal Autonomous Robots	Ch. 36 Scholz & Galliot
Week 8	AI and Labor / The Future of Work	Ch. 10 – AI and Employment	Ch. 14 Moradi & Levy, Ch. 43 Ajunwa
Week 9	Moral Status & Rights of AI	Ch. 11 – Sentience and Moral Status	Ch. 15 Basl & Bowen, Ch. 17 Kingwell
Week 10	Superintelligence and Long-Term Ethics	Ch. 13 – Superintelligence	Ch. 16 Turner & Schneider, Ch. 28 Gunkel

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PHIL 175

Philosophy of Perception

Instructor:

Term:

Meeting Times:

Office

Office Hours:

Catalog Description

PHIL 175 Philosophy of Perception 4. Lecture, 3 hours. Additional reading, 3 hours. Examines the nature of perception, especially vision, from a philosophically informed interdisciplinary point of view. Prerequisite(s): CGIS 001 or CS 011 / MATH 011 or PHIL 006 or PHIL 008 or PHIL 008H or PHIL 010 or PHIL 010H or PSYC 001.

Course Description

This course explores foundational and contemporary issues in the philosophy of perception, with a focus on vision. We examine classic debates about the nature of perceptual experience—such as the distinction between appearance and reality, the role of sense-data, and direct vs. indirect realism—alongside cutting-edge empirical research. Topics include the science of visual processing, the influence of cognition on perception (cognitive penetration), and the mechanisms of perceptual learning. Special attention is given to how perceptual experiences justify beliefs, and whether perception can be a source of knowledge. The course is interdisciplinary, integrating work from philosophy, cognitive psychology, and neuroscience. Students will engage with texts from both philosophical and empirical traditions, developing tools to critically assess the interface between perception, cognition, and epistemology. Students will engage with interdisciplinary perspectives from philosophy, cognitive science, and psychology to critically analyze how perception shapes—and is shaped by—cognition.

Learning Outcomes

The Philosophy of Perception course aims to provide students with a comprehensive understanding of both foundational and contemporary issues in perception, with a focus on vision. Drawing inspiration from the provided learning objectives, here are the learning objectives for this course:

1. Analyze the complex interplay between perception, cognition, and epistemology, integrating insights from philosophy, cognitive psychology, and neuroscience.
2. Critically evaluate classic debates in the philosophy of perception, such as the distinction between appearance and reality, the role of sense-data, and direct vs. indirect realism.
3. Understand and explain foundational theories of visual perception.
4. Assess contemporary philosophical debates about cognitive penetration and perceptual malleability.

5. Apply interdisciplinary perspectives from philosophy, cognitive science, and psychology to analyze how perception shapes—and is shaped by—cognition.
6. Synthesize theories of visual perception with their philosophical implications, demonstrating the ability to connect empirical research with conceptual analysis.

Required Texts

1. **Palmer, Stephen E.** *Vision Science: Photons to Phenomenology* (Oxford University Press, 1999).
2. **Stokes, Dustin R.** *Thinking and Perceiving* (Routledge, 2021).

Weekly Schedule

Week	Topics & Readings	Assignments
1	Introduction to Vision Science Palmer, Ch. 1: <i>An Introduction to Vision Science</i> Focus: Visual systems and optical information	Reflection: <i>What does it mean to “see”? Discuss the role of optical information.</i>
2	Theoretical Approaches to Vision Palmer, Ch. 2: <i>Classical Theories & Information Processing</i> Focus: Stages of visual perception	Debate: <i>Is perception purely mechanical or inherently interpretive?</i>
3	Perception vs. Cognition Stokes, Ch. 1: <i>Distinctions, Similarities, Relations</i> Focus: Representational content in perception vs. cognition	Essay: <i>Compare Palmer’s stages of perception with Stokes’ distinctions.</i>

4	Modularity in Mental Architecture Stokes, Ch. 2: <i>The Case for Modularity</i> Focus: Theories of mental architecture	Discussion: <i>Does modularity limit or enhance perceptual accuracy?</i>
5	Cognitive Penetration I Stokes, Ch. 3: <i>Initial Case for Malleability</i> Focus: Top-down effects on perception	Short paper: <i>Can beliefs influence what we perceive? Provide examples.</i>
6	Cognitive Penetration II Stokes, Ch. 4: <i>Consequentialist Understanding</i> Focus: Ethical implications of malleable perception	Midterm paper: <i>Analyze how cognitive penetration affects epistemological trust.</i>
7	Attention & Perceptual Influence Stokes, Ch. 5: <i>Attention & Cognitive Influence</i>	Group presentation: <i>How does attention shape perceptual accuracy?</i>
8	Perceptual Expertise I Stokes, Ch. 6: <i>Mental Architecture</i>	Annotated bibliography for final paper
9	Perceptual Expertise II Stokes, Ch. 7: <i>Epistemology</i>	Draft workshop: Final paper outlines
10	Consequences of Perceptual Malleability Stokes, Ch. 8: <i>Philosophical Implications</i>	Final paper due: Synthesize Palmer's theories with Stokes' arguments

Assignments & Grading

- **Participation (20%):** Active engagement in discussions and debates.
- **Reflections/Debates (20%):** Weekly short responses or debate contributions.
- **Midterm Paper (20%):** A critical analysis of cognitive penetration (1,500 words).
- **Final Paper (40%):** A synthesis of visual perception theories with philosophical implications (3,000 words).

GRADING SCALE

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

STUDENT RESPONSIBILITIES

Participation

This course requires your active participation. Please come to class ready to discuss readings, share relevant experiences, and respectfully engage with what others have to say. Because of the importance of participation in this course, you are expected to attend every session, and attendance will be recorded. You are allowed two unexplained absences without penalty; any absences after that will affect the participation component of your grade.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class. We will decide on a policy for laptop use together on the first day of class.

Disabilities

If you have a disability that may affect your academic performance, please let me know and make sure that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need.

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UCR Education Abroad

<https://international.ucr.edu/abroad>

UC Education Abroad Program

<https://uceap.universityofcalifornia.edu>

PHIL 180

Advanced Topics in the Theory of Knowledge

Instructor:
Office:
Office Hours:
Email:
Meeting Times:
Meeting Location:

CATALOG DESCRIPTION

PHIL 180 Advanced Topics in Theory of Knowledge 4. Lecture, 3 hours. Additional reading, 3 hours. *Prerequisite(s): CS 011 / MATH 011 or PHIL 008 or PHIL 008H or PHIL 124; and at least one course from LING 151, PHIL 130, PHIL 131, PHIL 132, PHIL 133, PHIL 134, PHIL 136, PHIL 137, PHIL 139, PHIL 142, PHIL 143, PHIL 144, PHIL 148, PHIL 146, or PHIL 147.* Examines key issues in contemporary research in the theory of knowledge. Topics may include the analysis of knowledge, recent work on radical skepticism, empirical findings relevant to theories of knowledge, semantic and contextualist approaches, social epistemology, and feminist approaches to knowledge. Course is repeatable for a maximum of 12 units as topics vary with consent of the instructor.

Course Description

This course explores contemporary debates in epistemology through the lens of Timothy Williamson's landmark book *Knowledge and Its Limits* (Oxford University Press, 2000). Williamson is one of the most influential philosophers of the last thirty years. In this book, Williamson challenges traditional approaches by putting knowledge at the foundation of epistemology rather than treating it as reducible to belief, justification, or truth. We will critically engage with his "knowledge-first" framework, addressing issues such as the nature of evidence, the luminosity of mental states, the role of knowledge in assertion, and responses to skepticism. Each week, we will supplement Williamson's work with critical perspectives from *Williamson on Knowledge* (Oxford University Press, 2009). Students will be equipped by the end of the course to follow and contribute to contemporary debates in epistemology.

Learning Objectives

By the end of the course, students should be able to:

- Explain and critically assess Williamson's knowledge-first epistemology.
- Engage with contemporary debates on knowledge, evidence, and assertion.
- Develop well-reasoned philosophical arguments related to epistemology.
- Apply knowledge-first insights to broader philosophical and real-world contexts.

Course Requirements

Participation	(15%) class discussion & activities
Weekly Reading Responses	(20%) 2-3 pages
Midterm Paper	(25%) 5-7 pages analyzing a key argument
Final Paper	(40%) 10-12 pages developing a critical argument

Grading Scale

97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-

Course Schedule

Week 1: Introduction to Knowledge-First Epistemology

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 1 ("Knowing and Acting")

Supplementary Reading:

- Greenough & Pritchard, "Introduction," in *Williamson on Knowledge*

Discussion Topics:

- The shift from traditional epistemology to "knowledge-first" epistemology
- Knowledge vs. belief: What changes if knowledge is fundamental?

Week 2: Knowledge as a Mental State

Primary Reading:

Williamson, *Knowledge and Its Limits*, Ch. 2 ("Unanalysable Knowledge")

Supplementary Reading:

- Fricker, "Is Knowing a State of Mind?" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- The failure of traditional analyses of knowledge
- Knowledge as a mental state and its implications for epistemology

Week 3: The Problem of Luminosity

Primary Reading:

Williamson, *Knowledge and Its Limits*, Ch. 4 ("Anti-Luminosity")

Supplementary Reading:

- Steup, "Are Mental States Luminous?" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- The argument against the luminosity of mental states
- Implications for self-knowledge and internalism

Week 4: Margins for Error and Iterated Knowledge

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 5 ("Margins and Iterations")

Supplementary Reading:

- Schiffer, "Evidence = Knowledge: Williamson's Solution to Skepticism" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- The relationship between knowledge, evidence, and error
- The problem of knowing that one knows

Week 5: Skepticism and the Difference Between Good and Bad Cases

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 8 ("Skepticism")

Supplementary Reading:

- Hawthorne & Lasonen-Aarnio, "Knowledge and Objective Chance" in * *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- The skeptic's argument and Williamson's response
- How does evidence differ in "good" and "bad" cases?

Week 6: Knowledge as Evidence

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 9 ("Evidence")

Supplementary Reading:

- Goldman, "Williamson on Knowledge and Evidence" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- Williamson's equation: Evidence = Knowledge
- Implications for Bayesian epistemology

Week 7: Probabilistic Epistemology and Uncertain Evidence

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 10 ("Evidential Probability")

Supplementary Reading:

- Kaplan, "Williamson's Causal Approach to Probabilism" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- How does knowledge interact with probability?
- The role of evidence in updating beliefs

Week 8: The Knowledge Norm of Assertion

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 11 ("Assertion")

Supplementary Reading:

- Kvanvig, "Assertion, Knowledge, and Lotteries" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- Is knowledge the norm of assertion?
- Lottery paradoxes and assertion

Week 9: The Paradox of Knowability and Structural Unknowability

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Ch. 12 ("Structural Unknowability")

Supplementary Reading:

- Tennant, "Cognitive Phenomenology, Semantic Qualia, and Luminous Knowledge" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- Fitch's paradox and its implications
- Can there be unknowable truths?

Week 10: Summary, Criticisms, and the Future of Epistemology

Primary Reading:

- Williamson, *Knowledge and Its Limits*, Conclusion

Supplementary Reading:

- Sosa, "Timothy Williamson's Knowledge and Its Limits" in *Williamson on Knowledge*
- Williamson, Selection from "Replies to Critics" in *Williamson on Knowledge*

Discussion Topics:

- Strengths and weaknesses of knowledge-first epistemology
- Future directions in epistemology

STUDENT RESPONSIBILITIES

Participation

This course requires your active participation. Please come to class ready to discuss readings, share relevant experiences, and respectfully engage with what others have to say. Because of the importance of participation in this course, you are expected to attend every session, and attendance will be recorded. You are allowed two unexplained

absences without penalty; any absences after that will affect the participation component of your grade.

Communication & Electronic Devices

Please be reasonable and courteous when it comes to using electronic devices in the classroom. Make sure your phones are silenced for the duration of the class. We will decide on a policy for laptop use together on the first day of class.

Disabilities

If you have a disability that may affect your academic performance, please let me know and make sure that the relevant documentation is on file with Student Disability Resource Center, so we can ensure you have the accommodations you need.

Academic Integrity

Students are responsible for knowing what constitutes academic integrity. Further information on what constitutes academic integrity and sanctions can be found here: https://studentdocs.ucr.edu/conduct/uc-riverside_scaip_sanction-guidelines.pdf

Resources

All readings (and other resources) will be made available on iLearn. Please read the required readings in the order listed, and at least skim the optional readings if you have time.

iLearn will function as an information hub for the course, and will contain a variety of important resources such as assignment instructions and lecture slides, so please make sure to check it regularly. Also, I will often use iLearn to make important announcements about the course, so make sure that your iLearn notifications are set up appropriately.

STUDENT SUPPORT SERVICES

ARC: Academic Resource Center

<https://arc.ucr.edu>

CAPS: Counseling & Psychological Services

<https://counseling.ucr.edu>

SDRC: Student Disability Resource Center

<https://sdr.c.ucr.edu>

UCR Education Abroad

<https://international.ucr.edu/abroad>

UC Education Abroad Program

<https://uceap.universityofcalifornia.edu>

Appendix H. Other Universities with (and without) Cognitive Science

UNIVERSITY OF CALIFORNIA

Berkeley

<https://cogsci.berkeley.edu/home>

Davis

<https://www.ucdavis.edu/majors/cognitive-science>

Irvine

<https://www.cogsci.uci.edu/>

Los Angeles

<https://www.psych.ucla.edu/undergraduate/psychology-undergraduate-advising/majors-minors/cognitive-science-major/>

Merced

<https://cogsci.ucmerced.edu/>

Riverside NONE

San Diego

<https://cogsci.ucsd.edu/undergraduates/major/bs-cogsci.html>

Santa Barbara (PhD emphasis)

<https://www.cogsci.ucsb.edu/>

Santa Cruz

<https://catalog.ucsc.edu/current/general-catalog/academic-units/social-sciences-division/psychology/cognitive-science-bs/>

CALIFORNIA STATE UNIVERSITY WITH COGNITIVE SCIENCE

Only at 2 of 23 campuses:

- Fresno State (within Linguistics Dept)
- Stanislaus State

OTHER PUBLIC RESEARCH UNIVERSITIES WITH AND WITHOUT

Arizona State University (PhD only)

Indiana University

Michigan State University

Ohio State University (Minor)

Oregon State University (None)
Purdue University (None)
Rutgers University, New Brunswick
University of Arizona
University of Indiana, Bloomington
University of Maryland
University of Michigan
University of Nevada, Las Vegas (None)
University of New Mexico (None)
University of Oregon (None)
University of Washington (None)

SOME PRIVATE RESEARCH UNIVERSITIES WITH COGNITIVE SCIENCE

Brown University
Columbia University
Dartmouth College
Harvard University
Johns Hopkins University
Notre Dame University
University of Pennsylvania
Rice University
Stanford University
University of Southern California
Vanderbilt University

CALIFORNIA REGIONAL PRIVATE UNIVERSITIES WITHOUT COGNITIVE SCIENCE

California Baptist University
California Lutheran University
Loyola Marymount University
Pepperdine University
Santa Clara University
University of La Verne
University of Redlands
University of San Diego (Minor)

SOME LIBERAL ARTS COLLEGES WITH COGNITIVE SCIENCE

Occidental College
Pomona College
Swarthmore
Williams College

Appendix I. Major Requirements at UC Merced and Occidental College

UC MERCED

LD [22-24 Units]

COGS 001 Introduction to Cognitive Science

Two Additional Introductory Courses from:

COGS 005 Introduction to Language and Linguistics

ECON 001 Introduction to Economics

PHIL 001 Introduction to Philosophy

PSY 001 Introduction to Psychology

Complete the Following Two Courses:

PSY 010 Analysis of Psychological Data

ECON 101 or MATH 032 (may be considered by petition) or MATH 011 Calculus (or equivalent)

An Introductory Lower Division Computing Course, such as:

CSE 005: Introduction to Computer Applications

CSE 020: Introduction to Computing

UD [28 units]

COGS 101: Mind, Brain, and Computation

COGS 105: Research Methods for Cognitive Scientists

Four additional UD COGS courses

One additional UD course in Cognitive Science, Philosophy, Political Science, Psychology, Arts, Management, Economics, Biology, or Computer Science and Engineering

OCCIDENTAL COLLEGE

COGS 101 Introduction to Cognitive Science

PHIL 150 Formal Logic

COGS 201 Empirical Methods in Cognitive Science

PSYC 306 Cognitive Psychology

COGS 320 Cognitive Neuroscience

COGS 490 Senior Seminar in Cognitive Science

Computation

COGS 242 Computational Approaches to Cognition

Linguistics

COGS 330 Linguistics for Cognitive Science
COGS 301 Introduction to Linguistics
PSYC 351 Psycholinguistics

Philosophy

COGS 308 Historical and Philosophical Foundations of Cognitive Science
PHIL 242 Minds, Agents, and Persons
PHIL 243 Representation and Reality
PHIL 311 Wittgenstein
PHIL 323 Logic, Language, and Knowledge in Medieval Philosophy
PHIL 342 Theory of Knowledge
PHIL 344 Language, Translation, and Meaning
PHIL 345 Consciousness and Cognition

Additional Electives

Vertebrate Physiology
Biostatistics
Developmental Biology
Neurobiology
Sensory Biology and Neurophysiology
Computational Biology
Animal Behavior
Data Science
Fundamentals of Computer Science
Topics in Artificial Intelligence
Natural Language Processing
Machine Learning
Information Theory
Cognitive Science and Culture
Game Theory
Behavioral Economics
Second Language Acquisition
Motor Learning and Control Phonetics
Statistical Data Science
Probability
Metalogic
Set Theory and Foundations of Mathematics
Numerical Analysis
Modern Philosophy
Knowledge and Power
Paradoxes
Statistics in Psychological Science
Perception
Physiological Psychology Lab
Thinking and Reasoning

Up-to-date Introduction to Cognitive Science Textbooks

Jose Luis Bermudez, *Cognitive Science: An Introduction to the Science of the Mind*, Cambridge University Press, 4th edition, 409 Pages

Carolyn Sobel and Paul Li, *The Cognitive Sciences: An Interdisciplinary Approach*, SAGE, 2nd edition, 440 pages.

Jay Friedenberg, Gordon Silverman, and Michael Spivey, *Cognitive Science: An Interdisciplinary Study of the Mind*, 4th edition, SAGE, 568 pages
<https://us.sagepub.com/en-us/nam/cognitive-science/book259373>

Appendix J. Existing UCR Philosophy Major, Catalog Copy

Philosophy

Subject abbreviation: PHIL

College of Humanities, Arts, and Social Sciences

Michael Nelson, Ph.D., Chair

Department Office, 1606 Humanities and Social Sciences (951) 827-3760;
philosophy.ucr.edu

Professors

Luca Ferrero, Ph.D.

John M. Fischer, Ph.D., University Professor

Peter J. Graham, Ph.D., Distinguished Professor

Agnieszka Jaworska, Ph.D.

Barry Lam, Ph.D.

Andrews Reath, Ph.D.

Erich Reck, Ph.D.

Eric Schwitzgebel, Ph.D., Distinguished Professor

Howard K. Wettstein, Ph.D.

Professors Emeriti

Maudemarie Clark, Ph.D., Distinguished Professor

Carl F. Cranor, Ph.D., Distinguished Professor

David K. Glidden, Ph.D.

David Harrah, Ph.D.

John Perry, Ph.D., Distinguished Professor

Gary Watson, Ph.D. Distinguished Professor

Larry Wright, Ph.D.

Associate Professors

Myisha Cherry, Ph.D.

Adam Harmer, Ph.D.

Pierre Keller, Ph.D.

Coleen Macnamara, Ph.D.

Jozef Müller, Ph.D.

Michael Nelson, Ph.D.

Alexandra Newton, Ph.D.

Assistant Professors.

Kim Frost, Ph.D.

Dylan Shaul, Ph.D.

Majors

The Department of Philosophy offers a major and minor in Philosophy and a major in Philosophy/Law and Society.

The **Philosophy major** is designed to introduce students to the important issues and arguments surrounding such subjects as morality, knowledge, the nature of the mind and of the physical world, science, and language. The program provides a rigorous background in the history of Western philosophy, and studies contemporary approaches (both analytic and Continental) to philosophical issues. The B.A. degree in Philosophy prepares students for graduate study in philosophy, and is also excellent preparation for law school. For students interested in a double major, philosophy also serves as an excellent complement to psychology, mathematics, political science, and the natural sciences.

The **Philosophy/Law and Society** major is open to undergraduate students with junior standing who have completed LWSO 100 with a grade of “C” or higher. The major offers students a means of understanding complex relationships between social institutions and provides a strong basis for graduate studies in areas related to law and philosophy. The Philosophy/Law and Society curriculum is sound background for students planning on pursuing the study of law.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

The department offers two majors: the traditional Philosophy major, and a Philosophy/Law and Society major.

Philosophy Major

The major requirements for the B.A. degree in Philosophy are as follows:

Fifty-six (56) units of course work in Philosophy including at least 36 upper-division units.

PHIL 007 or PHIL 007H and PHIL 008 or PHIL 008H

PHIL 100 or PHIL 101 (Sophomore-Junior Seminar)

Three courses in the history of philosophy, at least one of which must be in ancient Greek or Roman philosophy. Select courses from PHIL 030 (E-Z), PHIL 120 (E-Z), PHIL 121 (E-Z), PHIL 122 (E-Z); a specific list is provided by the Philosophy Department. Not more than two courses may be from PHIL 030 (E-Z)

At least two courses in metaphysics, epistemology, or philosophy of language: PHIL 130 through PHIL 152, PHIL 159.

At least one course in moral and political philosophy: PHIL 108, PHIL 116, PHIL 117, PHIL 119, PHIL 153, PHIL 161 through PHIL 169 (E-Z).

Students are urged to consult the department's undergraduate advisor in preparing their course of study each quarter while at UCR.

Track for Distinction in Philosophy

The undergraduate track for Distinction in Philosophy is designed to give qualified upper division students the opportunity to do additional upper division work in Philosophy in a seminar format beyond what is required for the major. It will give students the opportunity and the training to do independent research in Philosophy.

Each Philosophy major in the track for Distinction in Philosophy will be assigned a faculty mentor upon entering the program. Faculty are encouraged to provide more challenging assignments to these students in their upper-division classes (such as term papers, revision of a paper in response to feedback, etc.).

Philosophy students who successfully complete this program are awarded and have posted on their transcript the designation Distinction in Philosophy.

Complete details and an application form are available from the Philosophy Student Affairs Officer.

Prerequisites for the track for Distinction in Philosophy

Submission of an application during the last quarter of the sophomore year or during the junior year (no later than the last quarter of the junior year).

Completion of 90 units (junior standing).

Completion of PHIL 7, PHIL 8, PHIL 100/101, and 2 upper-division courses in Philosophy. Students are encouraged to take the 2 courses in the PHIL 30 series (see below) as early in their major as possible.

Cumulative GPA of 3.5 in Philosophy

These pre-requisites can be waived by permission of the Department under exceptional circumstances. Inquiries may be directed to the Philosophy Student Affairs Officer.

Requirements for the track for Distinction in Philosophy

This track adds some requirements to the Philosophy major:

64 units in Philosophy, of which 48 units must be upper division. (The major requires 56 units, of which 36 units must be upper division.)

2 courses in the PHIL 30 series. (These courses count toward the 64 units and the three courses in the History of Philosophy.)

2 quarters of either PHIL 193 OR PHIL 193 and PHIL 195 (8 units total). Students in the University Honors Program may substitute 4 units of HNPG 199H for 4 units of

PHIL195. (These courses count towards the 64 units. With Department approval, PHIL 193 and PHIL 195 may be applied toward the History of Philosophy, Metaphysics/Epistemology/Philosophy of Language, or Moral/Political Philosophy requirements.)

To receive Distinction in Philosophy, students must have a cumulative GPA of 3.5 in Philosophy upon completion of the program