Department of Cognitive Sciences

Mark Steyvers, Department Chair
2201 Social & Behavioral Sciences Gateway
949-824-6692
http://www.cogsci.uci.edu/

Cognitive Science is a multidisciplinary field integrating behavioral research, computational models, and neuroscience. The Department of Cognitive Sciences at UC Irvine has a tradition of excellence in quantitative approaches to understanding the brain, perception, cognition, and behavior. The department maintains its historic strengths in mathematical psychology, and has expanded to include computational approaches to studying cognition. The department has also grown a strong and broad research program and graduate concentration in cognitive neuroscience, with expertise ranging from language and memory to brain-computer interfaces. The department continues to specialize in vision and auditory research, and has newer research areas in the language sciences, cognitive development, and cognitive robotics.

Undergraduate Information

Students should be aware that psychology courses are offered in several different departments and programs. The B.S. in Psychology emphasizes the study of the mind and brain grounded in knowledge of physical and biological sciences. The B.S. in Cognitive Sciences exposes students to the theoretical foundations and experimental and computational methods of cognitive science and neuroscience research. Students interested in other areas of psychology are advised to consult the course listings in the School of Social Ecology (http://catalogue.uci.edu/schoolofsocialecology/) and the School of Biological Sciences (http://catalogue.uci.edu/charliedunlopschoolofbiologicalsciences/) sections.

- Cognitive Sciences, B.S.
- Cognitive Sciences, Ph.D.
- Hearing and Speech Sciences, Minor
- Psychology, B.S.
- Psychology, Minor

Faculty

Bruce G. Berg, Ph.D. Indiana University, *Professor of Cognitive Sciences* (audition, auditory attention, psychophysics of complex sounds, computational models of hearing)

Aaron Bornstein, Ph.D. New York University, *Associate Professor of Cognitive Sciences* (memory, decision-making, reinforcement learning, neuroimaging, computational cognitive neuroscience)

Alyssa Brewer, Ph.D. Stanford University, *Associate Professor of Cognitive Sciences; Language Science* (visual, auditory, somatosensory/pain perception and attention, sensory deficits and neurological disorders, computational neuroimaging)

Nadia Chernyak, Ph.D. Cornell University, *Associate Professor of Cognitive Sciences; Logic and Philosophy of Science; Psychological Science* (cognitive development, social cognition, prosocial behavior, moral cognition, agency and free will, conceptual development)

Barbara A. Dosher, Ph.D. University of Oregon, *Distinguished Professor of Cognitive Sciences* (human information processing, memory retrieval, attention, visual perception)

Emily D. Grossman, Ph.D. Vanderbilt University, *Professor of Cognitive Sciences* (visual perception, neuroimaging)

Gregory S. Hickok, Ph.D. Brandeis University, *Distinguished Professor of Cognitive Sciences; Language Science* (neural architecture of speech and language, evolutionary origins of music and speech, aphasia)

Jeffrey L. Krichmar, Ph.D. George Mason University, *Professor of Cognitive Sciences; Computer Science* (computational neuroscience, robotics, artificial intelligence, neural networks)

Michael D. Lee, Ph.D. University of Adelaide, *Professor of Cognitive Sciences; Logic and Philosophy of Science* (computational models and bayesian methods in decision making, representation, categorization, individual differences, and the wisdom of the crowd)

Anna Leshinskaya, Ph.D. Harvard University, *Assistant Professor of Cognitive Sciences* (learning, relational reasoning, computational cognitive neuroscience, semantic memory, artificial intelligence alignment/interpretability)

Mimi Liljeholm, Ph.D. University of California, Los Angeles, *Associate Professor of Cognitive Sciences* (agency, causal induction, compositionality, motivation, compulsion, social transmission)

Sara Mednick, Ph.D. Harvard University, *Professor of Cognitive Sciences* (memory consolidation, sleep, pharmacology, aging, brain stimulation)

Cherlyn Ng, Ph.D. National University of Signapore, *Assistant Professor of Cognitive Sciences* (visual perception, neuroplasticity, physiological optics, psychophysics, computational modeling)

Megan Peters, Ph.D. University of California, Los Angeles, *Associate Professor of Cognitive Sciences; Logic and Philosophy of Science* (perception, metacognition, consciousness, computational modeling, computational cognitive neuroscience)

Zygmunt Pizlo, Ph.D. University of Maryland at College Park, *Falmagne Endowed Chair and Professor of Cognitive Sciences* (human and machine vision, 3D shape, symmetry, virtual reality, robotics, problem solving)

Virginia Richards, Ph.D. University of California, Berkeley, *Professor of Cognitive Sciences* (auditory perception and cognition, human psychophysics)

Jeffrey Rouder, Ph.D. University of California, Irvine, *Falmagne Endowed Chair and Professor of Cognitive Sciences; Logic and Philosophy of Science* (mathematical and statistical models of perception and cognition, bayesian mixed models, psychometrics)

Kourosh Saberi, Ph.D. University of California, Berkeley, *Professor of Cognitive Sciences* (auditory perception, conscious systems, machine learning, artificial intelligence)

Barbara W. Sarnecka, Ph.D. University of Michigan, *Professor of Cognitive Sciences; Logic and Philosophy of Science* (cognitive development, language and conceptual change, writing and scientific communication)

Ramesh Srinivasan, Ph.D. Tulane University, *Professor of Cognitive Sciences; Biomedical Engineering* (brain networks, decision making, attention, coordination, multi-brain dynamics)

Mark Steyvers, Ph.D. Indiana University, *Department Chair and Professor of Cognitive Sciences; Computer Science; Psychological Science* (human-AI collaboration, higher-order cognition, learning, metacognition, hybrid human-AI systems, computational modeling)

Joachim S. Vandekerckhove, Ph.D. University of Leuven, *Professor of Cognitive Sciences; Logic and Philosophy of Science; Statistics* (response time modeling, model fitting, computational statistics, psychometrics, bayesian statistics)

Affiliate Faculty

Drew Bailey, Ph.D. University of Missouri, *Professor of Education; Cognitive Sciences; Psychological Science*

Liz Chrastil, Ph.D. Brown University, *Associate Professor of Neurobiology and Behavior; Cognitive Sciences*

Nia Dowell, Ph.D. The University of Memphis and Institute for Intellect Systems, *Assistant Professor of Education; Cognitive Sciences*

Nikil D. Dutt, Ph.D. University of Illinois at Urbana–Champaign, *Distinguished Professor of Computer Science; Cognitive Sciences; Electrical Engineering and Computer Science* (embedded systems, computer architecture, electronic design automation, software systems, brain-inspired architectures and computing)

Charless C. Fowlkes, Ph.D. University of California, Berkeley, *Professor of Computer Science; Cognitive Sciences* (artificial intelligence, computer vision, machine learning, computational biology)

Elizabeth F. Loftus, Ph.D. Stanford University, *UCI Distinguished Professor of Psychology; Cognitive Sciences; Criminology, Law and Society; School of Law* (cognitive psychology, human memory, psychology and law)

Bryce A. Mander, Ph.D. Northwestern University, *Associate Professor of Psychiatry and Human Behavior; Cognitive Sciences; Pathology and Laboratory Medicine*

John Middlebrooks, Ph.D. University of California, San Francisco, *Professor of Otolaryngology; Biomedical Engineering; Cognitive Sciences*

Cailin O'Connor, Ph.D. University of California, Irvine, *Chancellor's Professor of Logic and Philosophy of Science; Cognitive Sciences; Philosophy*

P. Kyle Stanford, Ph.D. University of California, San Diego, *Professor of Logic and Philosophy of Science; Cognitive Sciences; Philosophy*

Craig Stark, Ph.D. Carnegie Mellon University, *Professor of Neurobiology and Behavior; Cognitive Sciences*

Hal S. Stern, Ph.D. Stanford University, *Chancellor's Professor of Statistics; Cognitive Sciences*

Fan-Gang Zeng, Ph.D. Syracuse University, *Director of Hearing Research and Professor of Otolaryngology; Anatomy and Neurobiology; Biomedical Engineering; Cognitive Sciences*

Cognitive Sciences Courses

COGS 7A. Introduction to Psychology. 4 Units.
Introduction to field of psychology, addressing the application of scientific methods to the study of human development, learning, memory, problem solving, perception, biological mechanisms, emotions and motivation, personality, psychopathology, and effects of diverse social and cultural contexts on human behavior.
Same as PSCI 9
COGS 7A may not be taken for credit if taken after or concurrently with COGS 9A, COGS 9B, COGS 9C, PSCI 11A, PSCI 11B, or PSCI 11C.
(III)

COGS 9A. Psychology Fundamentals. 4 Units.
Part of a three-course series that provides a comprehensive introduction to psychology. Required for students majoring in Cognitive Sciences, Psychological Science, and Psychology. Topics include the science of psychology, research methods, biology and behavior, consciousness, sensation, and perception.
Same as PSCI 11A
COGS 9A may not be taken for credit if taken before PSCI 11A, PSCI 11B, PSCI 11C, COGS 9B, or COGS 9C.
(III)

COGS 9B. Psychology Fundamentals. 4 Units.
Part of a three-course series that provides a comprehensive introduction to psychology. Required for students majoring in Cognitive Sciences, Psychological Science, or Psychology. Topics include learning and memory, thinking, language and intelligence, human development, emotion, and motivation.
Same as PSCI 11B
(III)

COGS 9C. Psychology Fundamentals. 4 Units.
Part of a three-course series that provides a comprehensive introduction to psychology. Required for students majoring in Cognitive Sciences, Psychological Science, or Psychology. Topics include personality psychology, social psychology, abnormal and clinical psychology, and health psychology.
Same as PSCI 11C
(III)

COGS 10A. Exploratory Data Analysis. 4 Units.
Learn multiple ways of visualizing data, of transforming data, looking for consistencies and patterns in data, and interpreting these patterns to reach conclusions. Serves as first introduction to computer programming using the R language.
Restrictions: Cognitive Sciences majors, Psychology majors, and Hearing and Speech Sciences minors have the first consideration for enrollment.
(Va)

COGS 10B. Probability and Inference. 4 Units.
An introduction to probability and statistics. Emphasis on thorough understanding of the probabilistic and logical basis of formal statistical inference, and the concept of statistical evidence. Applications in R.
Prerequisite: COGS 10A with a minimum grade of C-.
Restrictions: Cognitive Sciences majors, Psychology majors, and Hearing and Speech Sciences minors have the first consideration for enrollment.
(Va)

COGS 10C. Statistical Models. 4 Units.
Students learn about standard procedures in statistics for the social sciences, with a focus on linear models for discovering the underlying structure in data. Applications in R.
Prerequisite: COGS 10A with a minimum grade of C-.
Restrictions: Cognitive Sciences majors, Psychology majors, and Hearing and Speech Sciences minors have the first consideration for enrollment.
(Vb)

COGS 14M. MATLAB Programming. 4 Units.
MATLAB is a mathematical software package for solving quantitative problems often encountered in experimental psychology. Topics include rudiments of programming, statistical analysis of data, matrix algebra, signal processing, graphic visualization, and simulated models of cognitive and perceptual processes.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 14P. Scientific Python for Research. 4 Units.
Introduces Python for data analysis and modeling encountered in cognitive science and neuroscience. Topics include data structures, execution control, graphic visualization, and interaction with sound and display interfaces. Application in statistical analysis, model simulation, and stimulus presentation and experimental control.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 21A. Adolescent Psychology. 4 Units.
Focuses on psychosocial dynamics of today's adolescents in America emphasizing the quest for identity, independence, values, and sexual orientation. The influence of society, family, school, and peers is analyzed. Strategies for helping troubled adolescents are discussed.
Overlaps with PSCI 112D.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.
(III)

COGS 56L. Acquisition of Language. 4 Units.
What children say, what they mean, and what they understand. Theories about the learning of language by one-, two-, and three-year-olds. Comparison of kinds of data on which these theories are based.
Same as LSCI 51
(III)

COGS 60N. Neurobiology of Cognition. 4 Units.
Introduces the neurobiological components of human cognition. Topics include discussion of the cortical structures and functions that underlie these behaviors. Emphasis placed on the development and organization of the healthy brain.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 78A. Self-Identity and Society. 4 Units.
Studies sociological contributions to theory and research in social psychology, with focus on the social influences on personality, attitudes, beliefs, and behavior; socialization, human groups, and social interaction.
Same as SOCIOL 31
(III)

COGS 89. Special Topics in Lower-Division Cognitive Sciences. 4 Units.
Studies in selected areas of cognitive science at the lower-division level. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: May be taken unlimited times as topics vary
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS H101A. Honors Seminar in Psychology and Cognitive Sciences I. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.
Grading Option: Pass/Not Pass only
Restrictions: Cognitive Sciences majors and Psychology majors only.

COGS H101B. Honors Seminar in Psychology and Cognitive Sciences II. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.
Prerequisite: COGS H101A with a minimum grade of C-.
Grading Option: Pass/Not Pass only
Restrictions: Cognitive Sciences majors and Psychology majors only.

COGS H101C. Honors Seminar in Psychology and Cognitive Sciences III. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.
Prerequisite: COGS H101B with a minimum grade of C-.
Restrictions: Cognitive Sciences majors and Psychology majors only.

COGS 105. Introduction to Statistical Learning. 4 Units.
Introduction to statistical learning as a tool for scientific research. Topics include linear regression, logistic regression, model selection, cross-validation, ridge and Lasso regularization, classification trees, ensemble methods, random forests, unsupervised learning, PCA, k-means clustering, Gaussian mixture models, and PLS regression.
Prerequisite: COGS 14P or I&C SCI 31 or MATH 9 and ((COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-) or STATS 110) and MATH 2B.
Restrictions: Cognitive Sciences majors only.
Concurrent: COGS 205C

COGS 106. Computational Lab Skills. 4 Units.
Teaches programming tools, skills, and conventions for collaborative work in computational cognitive science. Topics covered include program structure, version control, random number generation, plotting, basic model fitting, and numerical optimization methods.
Prerequisite: COGS 14M or COGS 14P or I&C SCI 31 and ((COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-) or STATS 110).
Restrictions: Cognitive Sciences majors only.
Concurrent: COGS 205B

COGS 107. Cognitive Modeling. 4 Units.
Cognitive process models analyzed using computational Bayesian methods. Formal statistical specification of models, parameter estimation, model evaluation, and research applications. Covers multinomial process trees, signal detection theory, Thurstone ranking models, item-response theory, decision models, and reaction time models.
Prerequisite: COGS 14M or COGS 14P or I&C SCI 31 and ((COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-) or STATS 110).
Restrictions: Cognitive Sciences majors have the first consideration for enrollment.

COGS 108. Neural Analytics. 4 Units.
Introduces the theoretical foundations and practical applications of neural data analysis. Topics include models of neural signals, neural time series analysis, and machine learning applications in cognitive neuroscience.
Prerequisite: COGS 14M or COGS 14P or I&C SCI 31 and ((COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-) or STATS 110).
Restrictions: Cognitive Sciences majors have the first consideration for enrollment.

COGS 109. Cognitive Sciences Research Seminar. 4 Units.
Read and discuss examples of the primary research leading to the concepts covered in Psychology Fundamentals. Focuses on how this research is conducted and how inferences from it are drawn.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C).
Restrictions: Cognitive Sciences majors only.

COGS 112A. Experimental Psychology. 4 Units.
Emphasis on design of experiments and analysis of results. Experiments are conducted in laboratory sections.
Corequisite: COGS 112LA.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C) and (COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-) .
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112BW. Advanced Experimental Psychology. 4 Units.
Design and analysis of multivalent, factorial, and correlational studies. Students prepare proposals for independent research.
Corequisite: COGS 112LB.
Prerequisite: COGS 112A and COGS 112LA. Satisfactory completion of the Lower-Division Writing requirement.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.
(Ib)

COGS 112C. Research in Experimental Psychology. 4 Units.
Each student conducts a research project in experimental psychology. The projects are discussed in a seminar format. Written reports on each project are submitted at the end of the quarter.
Corequisite: PSYCH 112LC.
Prerequisite: COGS 112BW and COGS 112LB.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LA. Experimental Psychology Laboratory. 2 Units.
Required laboratory section and co-requisite for COGS 112A.
Corequisite: COGS 112A.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LB. Advanced Experimental Psychology Laboratory. 2 Units.
Required laboratory section for COGS 112BW.
Corequisite: COGS 112BW.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LC. Research in Experimental Psychology. 0 Units.
Required laboratory section and co-requisite for COGS 112C.
Corequisite: COGS 112C.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LM. Research Methods in Psychology Laboratory. 2 Units.
Required laboratory section and co-requisite for COGS 112M.
Corequisite: COGS 112M.
Restrictions: Psychology majors and Cognitive Sciences majors have the first consideration for enrollment.

COGS 112LN. fMRI Research Laboratory. 2 Units.
Required laboratory section and corequisite for COGS 112N.
Corequisite: COGS 112N.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LP. Research in Perception and Psychophysics Laboratory. 2 Units.
Required laboratory section and corequisite for COGS 112P.
Corequisite: COGS 112P.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112LR. Cognitive Robotics Laboratory. 2 Units.
Required laboratory section and corequisite for COGS 112R.
Corequisite: COGS 112R.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112M. Research Methods in Psychology. 4 Units.
Research methods in psychology for majors who wish to fulfill this requirement separately from upper-division writing. Covers both experimental and descriptive research methods, analysis of results, and reading the psychological literature. Research experience is provided in laboratory sections.
Corequisite: COGS 112LM.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C) and (COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112N. Introduction to fMRI Research. 4 Units.
Introduction to functional magnetic resonance imaging as a tool in cognitive neuroscience. Covers inferences about brain activity using MRI, evaluates experimental design considerations, and univariate and multivariate statistical analysis approaches.
Corequisite: COGS 112LN.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C) and (COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112P. Research in Perception and Psychophysics. 4 Units.
Introduction to design and practice of experiments: students perform auditory, visual, tactile, or other experiments. Emphasis on methodology, finding and reading previous research, generating research ideas, statistical analysis.
Corequisite: COGS 112LP.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C) and (COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 112R. Cognitive Robotics. 4 Units.
Introduces concepts on experimental design, embodiment, robot construction, and computer programming. Concepts of embodied intelligence and case studies of cognitive robotics are covered in lecture. Simple robots are constructed and programmed to carry out different behavioral experiments in lab.
Corequisite: COGS 112LR.
Prerequisite: (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C) and (COGS 10B with a minimum grade of C- and COGS 10C with a minimum grade of C-).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 119. Special Topics in Research Methodologies. 1-4 Units.
Studies in selected areas of research methodologies. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: May be taken unlimited times as topics vary
Restrictions: Psychology majors and Cognitive Sciences majors have the first consideration for enrollment.

COGS 120A. Abnormal Psychology. 4 Units.
Introduction to psychopathology and behavioral deviations, and the concepts of theories regarding these conditions.
Prerequisite: COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4 or COGS 9C or PSCI 11C.
Overlaps with PSCI 102C.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 120D. Developmental Psychology. 4 Units.
A general introduction to the study of the physical, intellectual, social, and emotional development of the child from birth to adulthood.
Prerequisite: COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4 or COGS 9A or PSCI 11A.
Overlaps with PSCI 111D.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 120H. History of Psychology. 4 Units.
A history of the development of various schools and systems of psychological thought.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B) and (COGS 9C or PSCI 11C).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 120P. Personality Theories. 4 Units.
A survey of the evolution of personality theory during this century. An overview of major perspectives in the field, with special attention to Freud, Jung, and Adler.
Prerequisite: COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4 or COGS 9C or PSCI 11C.
Overlaps with PSCI 170S.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 121S. Psychology of Sleep and Consciousness. 4 Units.
Covers the physiology, neurochemistry, and neuroanatomy associated with sleep, contemporary sleep theory, REM and NREM, phenomenology, sleep disorders, examination of differences between conscious and unconscious cognitive function, the history of sleep and dream theories from ancient time to present day.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 122C. Clinical Psychology. 4 Units.
Provides overview of the clinical psychology field including theories and techniques used in counseling and testing.
Overlaps with PSCI 150C.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 122I. Organizational/Industrial Psychology. 4 Units.
Introduction to applied psychology in organizations, including personnel testing, selection, training and evaluation, job and classification analysis, job satisfaction and motivation, organizational development, leadership, market research, and consumer psychology. Potential ethical problems are discussed.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A) or (COGS 9B or PSCI 11B) or (COGS 9C or PSCI 11C).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 123C. Creativity. 4 Units.
Introduction to creativity, addressing creativity with respect to cognition, development, neuroscience, education, personality, motivation, and social aspects of creativity.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or ((COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B) and (COGS 9C or PSCI 11C)).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 124S. Sports Psychology. 4 Units.
Discusses the field of sports psychology with an emphasis on clinical practice including motivation, goal setting, performance skills, and mental skills. Discusses and utilizes a wide range of techniques designed to enhance performance and manage problems among athletes.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9C or PSCI 11C).
Overlaps with PSCI 139H.
Restrictions: Psychology majors and Cognitive Sciences majors have the first consideration for enrollment.

COGS 124V. Psychology of Violence. 4 Units.
Discusses the psychology of violence and aggression with an emphasis on understanding the psychological, social, and physiological roots of violent and aggressive behavior. Psychological treatment techniques and strategies for prevention of aggressive and violent behavior are also discussed.
Prerequisite: COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4 or COGS 9C or PSCI 11C.
Restrictions: Psychology majors and Cognitive Sciences majors have the first consideration for enrollment.

COGS 126M. Moral Psychology. 4 Units.
Survey course studying moral psychology and philosophy. Empirical research from psychology is supplemented with texts from philosophy for better grounding in philosophical theory.
Prerequisite: COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4 or COGS 9B or PSCI 11B.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 127P. Personality Disorders. 4 Units.
The history of personality disorder classification; defining characteristics of each disorder; the causes, courses, and outcomes of personality disorders; and information regarding assessment, prevention, and treatments of these disorders.
Prerequisite: PSCI 11C or COGS 9C.
Same as PSCI 168C

COGS 130A. Perception and Sensory Processes. 4 Units.
A general introduction to the scientific study of sensory processes and perceptual phonomena, with special emphasis in the visual systems.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 130N. Neuroscience of Perception. 4 Units.
Introduces the principles that human perception is determined by the properties of brain circuitry and that these brain circuits evolved to interpret the properties of the physical environment to explore human perception from peripheral sensory organs to cortical processing.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 131A. Vision. 4 Units.
Visual perception and the anatomy and physiology of the visual system. Topics include the retina and the visual pathway; visual sensitivity; color vision; spatial vision; motion perception; and the development of the visual system.
Same as BIO SCI N182
Restrictions: Cognitive Sciences majors, Psychology majors, and School of Biological Sciences students have the first consideration for enrollment.

COGS 131B. Hearing. 4 Units.
Auditory perception, the anatomy and physiology of the auditory system, and the physics of sound. Topics include neural transduction of sound, sensitivity, sound localization, complex sound perception, and hearing loss.
Prerequisite: (COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 140J. Judgment and Decision Making. 4 Units.
The psychology of human decision making. Theories, models, experiments, and data that inform how people make choices, judgments, and other decisions. Topics include optimality and bias, mental simulation, learning and feedback, expertise, emotional effects, and group decision making.
Prerequisite: COGS 9A and COGS 9B.
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 140L. Learning and Decision Making. 4 Units.
The psychological and neural bases of learning about and interacting with the world. Topics include shaping of behavior by rewards and punishments, abstraction of relational information, goal-directed versus habitual decision strategies, social knowledge transmission, and behavioral and substance addictions.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 140M. Human Memory. 4 Units.
Developments in the area of memory; history of memory research; theories of the nature of memory. Visual memory, recognition memory, high-speed scanning, free recall, short-term memory, mnemonics, retrieval, relationship of memory to thinking. Selected theoretical formulations for memory.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9B or PSCI 11B).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 143P. Human Problem Solving. 4 Units.
Modern developments in the psychology of human problem solving. Topics include concept identification, arithmetic, sets, logic puzzles, story problems, group problem solving, and theorem proving.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9B or PSCI 11B).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 150. Psychology of Language. 4 Units.
Examines language using the tools of experimental psychology. From sounds to words to spoken and written sentences, explores how language is used in real time, and how its use reveals how it is represented in the mind.
Prerequisite: LSCI 3 and (LSCI 51 or COGS 56L).
Same as LSCI 155

COGS 153. African American Psychology. 4 Units.
Historical overview of the development of black psychology and the African American frame of reference. Topics include personality development, psychological assessment, issues in education, black mental health, and the role of the African American psychologist in the community.
Same as AFAM 153

COGS 157M. Computational Methods for Language Research. 4 Units.
Focuses on computational methods useful for language research. Students become familiar with software and programming languages used for extracting information from electronic datasets and for creating basic simulations of linguistic cognition. No prior programming experience assumed.
Prerequisite: COGS 150 or LSCI 155 or COGS 156A or LSCI 151.
Same as LSCI 107M

COGS 160A. Introduction to Cognitive Neuroscience. 4 Units.
Introduction to the neural basis of human perceptual, motor, and cognitive abilities. Topics include sensory perception, motor control, memory, language, attention, emotion, frontal lobe function, functional brain imaging, and neuropsychological disorders.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or ((COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B)).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 160D. Brain Disorders and Behavior. 4 Units.
Examines the localization of human brain functions and the effects of neurological disorders on psychological functions such as perception, motor control, language, memory, and decision-making.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B) or BIO SCI 35 or BIO SCI N110 or BIO SCI N115A.
Same as BIO SCI N165
Restrictions: Biological Sciences majors, Cognitive Sciences majors, and Psychology majors have the first consideration for enrollment.

COGS 161. Language and the Brain . 4 Units.
Research analysis on biological bases of human linguistic capacity. Development, focusing on hemispheric specialization, plasticity; localization of specific linguistic functions in adults, with emphasis on study of aphasias; relation of linguistic capacity to general cognitive capacity, considering research on retardation.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B) or BIO SCI 35 or BIO SCI N110 or BIO SCI N115A.
Same as BIO SCI N160, LSCI 158

COGS 161H. Hearing and the Brain. 4 Units.
An overview of brain mechanisms of hearing, including perception of simple sounds, speech, and music. Begins with sound itself, and looks at processing by the ear, auditory pathways, auditory cortex, and beyond. Also auditory development, learning, and clinical issues.
Prerequisite: COGS 160A or BIO SCI 93 or BIO SCI H93.
Same as BIO SCI N147
Restrictions: Cognitive Sciences majors, Psychology majors, and School of Biological Sciences students have the first consideration for enrollment.
Concurrent: NEURBIO 260

COGS 161M. Evolution of Language and Music. 4 Units.
Focuses on the biological evolution of two rather unique human traits: language and music. No other species is capable of “doing” language or music with the complexity that humans can.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or ((COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B)) or LSCI 3.
Same as LSCI 171
Restrictions: Cognitive Sciences majors, Psychology majors, and Language Science majors have the first consideration for enrollment.

COGS 162N. Human Neuropsychology. 4 Units.
A survey of human brain disorders using a clinical case study approach to illustrate fundamental issues in studying brain and behavior. Topics include sensory deficits, attentional neglect, amnesia, cortical organization, clinical psychopathology, and more.
Prerequisite: BIO SCI N110 or BIO SCI N115A or COGS 9A or PSCI 11A.
Same as BIO SCI N173, PSCI 163C

COGS 163A. Metacognition. 4 Units.
Critical analysis of primary literature targeting metacognition in perception and memory, including neural correlates. Coverage includes behavioral experimental design, computational models, psychophysics, noninvasive neuroimaging, and neural stimulation approaches.
Prerequisite: (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or ((COGS 9A or PSCI 11A) and (COGS 9B or PSCI 11B)).
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 173A. Psychological Anthropology. 4 Units.
Cultural differences and similarities in personality and behavior. Child-rearing practices and consequent adult personality characteristics, biocultural aspects of child development and attachment, culture and behavior evolutionary models, politically linked personality, cognitive anthropology, psychology of narrative forms, comparative national character studies.
Prerequisite: ANTHRO 2A or (COGS 7A or PSCI 9 or AP Psychology Exam with a minimum score of 4) or (COGS 9A and COGS 9B and COGS 9C) or (PSCI 11A and PSCI 11B and PSCI 11C).
Same as ANTHRO 132A
Restrictions: Anthropology majors, Cognitive Sciences majors, Psychology majors, Anthropology minors, and Medical Anthropology minors have the first consideration for enrollment.

COGS 174H. Chicano/Latino Families. 4 Units.
Introduction to the research, literature, and issues surrounding the topic of Chicano/Latino families including cultural history, contemporary issues, organization of family, traditions, lifestyles, values, beliefs, generational differences, gender issues, ethnic identity, evolution of demographic patterns, current economic and political standings.
Same as CHC/LAT 170, PSCI 166S, SOC SCI 165

COGS 176A. Political Psychology. 4 Units.
Examination of how psychological theory and research may be used to better understand political thought and behavior. Drawing on theories of learning, cognition, and personality, discusses such topics as the formation of political attitudes, and the process of political decision-making.
Same as POL SCI 128C

COGS 177D. Deviance. 4 Units.
Perspectives on deviance and criminality in behavior, institution, community, and myth. The suitability of contemporary theories of deviant behavior.
Same as CRM/LAW C107, SOCIOL 156
Restrictions: Criminology, Law and Society majors, Social Ecology majors, Sociology majors, and Psychology majors have the first consideration for enrollment.

COGS 177F. Forensic Psychology: Advanced Seminar. 4 Units.
Focuses on the psychology of criminal offending, particularly violent behavior. Examines violence, sexual offending, and mental disorder related to crime with regard to clinical assessment and treatment; mental health services within forensic institutions.
Prerequisite: (PSCI 9 or PSCI 11C or COGS 7A or COGS 9C) and PSCI 102C and (PSCI 178S or CRM/LAW C149).
Same as CRM/LAW C136, PSCI 156C

COGS 178N. Social Psychology of Networks. 4 Units.
Review of network methods used in small group and organizational research. Discussion of social psychological literature relevant to the network of study of cognitive social structure, exchange/communication, identity negotiation, and social control. Case study of network datasets exemplifies research issues.
Same as SOCIOL 135

COGS 189. Special Topics in Upper-Division Cognitive Sciences. 4 Units.
Studies in selected areas of cognitive science at the upper-division level. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary
Repeatability: May be taken unlimited times as topics vary
Restrictions: Cognitive Sciences majors and Psychology majors have the first consideration for enrollment.

COGS 198. Directed Group Study. 1-4 Units.
Directed study with Cognitive Sciences faculty.
Repeatability: May be taken unlimited times

COGS 199. Independent Study. 1-4 Units.
Independent research with Cognitive Sciences faculty.
Repeatability: May be taken unlimited times as topics vary

COGS 201A. Cognitive Sciences Research Seminar. 1.3 Units.
Weekly reports and colloquia by faculty, students, and visitors.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.

COGS 201B. Cognitive Sciences Research Seminar. 1.3 Units.
Weekly reports and colloquia by faculty, students, and visitors.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.

COGS 201C. Cognitive Sciences Research Seminar. 1.4 Units.
Weekly reports and colloquia by faculty, students, and visitors.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.

COGS 202A. Proseminar in the Cognitive Sciences. 1 Unit.
Introduction to the conceptual foundations and basic research results in the cognitive sciences for first-year graduate students.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.

COGS 203A. Statistical Models for Cognitive Sciences I . 4 Units.
Logic and set theory are covered during the first three weeks, using an interactive computer system. The remaining seven weeks are devoted to probability theory and cover elementary concepts from samples spaces to Chebychev's Inequality and the moment generating function.

COGS 203B. Statistical Models for Cognitive Sciences II . 4 Units.
An introduction to statistical estimation and statistical inference. Topics include sufficiency and the Rao-Blackwell Theorem, completeness and the Lehmann-Scheffe Theorem. The method of maximum likelihood is explored in some detail. Inference in linear models covers regression and analysis of variance.

COGS 203C. Statistical Models for Cognitive Sciences III . 4 Units.
Discussion of the fundamentals of statistical inference and computational implementations of common statistical models.

COGS 204A. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focuses on grant writing and submission process, responsible conduct of research, and ethics training.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors, Cognitive Sciences majors, and Psychology majors only.

COGS 204B. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focus on scientific presentations and preparation.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors, Cognitive Sciences majors, and Psychology majors only.

COGS 204C. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focuses on career opportunities, interests and information, and community outreach.
Grading Option: Satisfactory/Unsatisfactory only
Restrictions: Cognitive Neuroscience majors, Cognitive Sciences majors, and Psychology majors only.

COGS 205C. Introduction to Statistical Learning. 4 Units.
Introduction to statistical learning for scientific research. Topics include linear regression, logistic regression, model selection, cross-validation, ridge and Lasso regularization, classification trees, ensemble methods, random forests, unsupervised learning, PCA, k-means clustering, Gaussian mixture models, and PLS regression.
Prerequisite: Required: Knowledge of calculus, computer programming, and undergraduate-level statistics.
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.
Concurrent: COGS 105

COGS 205D. Neural Networks and Machine Learning. 4 Units.
An introduction and review of the current state of the art in neural networks and machine learning with specific emphasis of applications to behavioral and neuroscience data analysis and modeling.

COGS 210A. Cognitive and Brain Sciences I: Topics in Perception. 4 Units.
Discusses models of cognition and evidence linking cognition and the brain. Focus is on visual, auditory, and somatic perception and bottom-up mechanisms of attention.
Repeatability: May be taken unlimited times as topics vary

COGS 210B. Cognitive and Brain Sciences II: Topics in Cognition. 4 Units.
Discusses models of cognition and evidence linking cognition and the brain. Focus is on emotion, top-down attention, goal-directed behavior, categorization, judgment, and decision-making.
Repeatability: May be taken unlimited times as topics vary

COGS 210C. Cognitive and Brain Sciences III: Topics in Learning and Development. 4 Units.
Discusses experimental data, formal models of learning, and evidence linking learning and development to its neural substrates. Topics include Pavlovian and instrumental conditioning, language acquisition, causal reasoning, perceptual learning, category formation, and structure learning.
Repeatability: May be taken unlimited times as topics vary

COGS 213. The Mind/Body Problem. 4 Units.
Multidisciplinary, drawing on information from the fields of quantum physics, computer vision, artificial intelligence, cognition, neurophysiology, philosophy, and psychophysics.

COGS 214. Bayesian Cognitive Modeling. 4 Units.
Considers a range of statistical methods of data analysis and simple cognitive models using the Bayesian graphical modeling framework.

COGS 218. Hearing. 4 Units.
Examines auditory sensation and perception using psychophysical and neuroscientific perspectives. Covers physical aspects of sound; subcortical auditory processing; aspects of sensation and perception such as sensitivity, sound localization, and complex-sound recognition; neuroscientific studies of cortical function; and abnormal auditory processing.

COGS 229. Special Topics in Human Cognition. 1.3-4 Units.
Current research in brain/ behavior relationships, human memory, and learning theory is presented.
Repeatability: May be taken unlimited times as topics vary

COGS 235. Analysis of Neural Time Series. 4 Units.
Hands-on introduction to techniques for the analysis of neural time series data, with a primary focus on the electroencephalogram (EEG). Topics may include the physiological basis of EEG, time-frequency analysis, spatial filtering, and methods of assessing connectivity.
Same as BME 235

COGS 237. Advanced Bayesian Cognitive Modeling. 4 Units.
Considers a range of advanced cognitive process models including models of signal detection, memory retention, category learning, stimulus representation, and reasoning using the Bayesian graphical modeling framework.
Prerequisite: COGS 214 with a minimum grade of B-.

COGS 239. Special Topics in Methodology and Models. 1.3-4 Units.
Current research in cognitive sciences methodologies, concepts, and models is presented.
Repeatability: May be taken unlimited times as topics vary

COGS 259. Special Topics in Human Performance. 1.3-4 Units.
Current research in the human issues involved with sensation, perception, and cognition.
Repeatability: May be taken unlimited times as topics vary

COGS 261N. Cortical Neuroscience. 4 Units.
Physiology of the cerebral cortex, theoretical neuroscience, and the neural basis of perception.

COGS 262. Functional Neuroanatomy. 4 Units.
It is impossible to truly understand human behavior without some understanding of the physical structure that enables behavior. Examines recent findings in functional neuroantomy through lectures and papers discussing links between particular behaviors and specific brain structures.

COGS 265. Introduction to Functional MRI. 4 Units.
Describes the fundamentals of imaging the human brain function using functional Magnetic Resonance Imaging (fMRI). Topics include basic fMRI physics, experimental design, and data acquisition and analysis.

COGS 268A. Computational Neuroscience. 4 Units.
Introduction to computational neuroscience. Mathematical models of single neurons, neural circuits, thalamocortical systems, and cortical mass action can stimulate single-unit, local field potential, and EEG dynamics. These models are used to investigate mechanisms of sensation, motor control, attention, and consciousness.

COGS 268R. Cognitive Robotics. 4 Units.
Introduces concepts for studying cognitive function by embedding brain models on robotic platforms. Topics include robot construction, computer programming, and the notion of embodiment. Students construct simple robots and program these robots to perform different behaviors.

COGS 269. Special Topics in Cognitive Neuroscience. 1.3-4 Units.
Current research in cognitive neuroscience.
Repeatability: May be taken unlimited times as topics vary

COGS 289. Special Topics in Sensation and Perception. 1.3-4 Units.
Current research in the reception and processing of visual and auditory stimuli presented.
Repeatability: May be taken unlimited times as topics vary

COGS 290. Dissertation Research. 1-12 Units.
Dissertation research with Cognitive Science faculty.
Repeatability: May be taken unlimited times
Restrictions: Cognitive Neuroscience majors and Cognitive Sciences majors only.

COGS 299. Individual Study. 4-12 Units.
Individual research with Cognitive Science faculty.
Repeatability: May be taken unlimited times

Psychology Courses

PSYCH 123P. Topics in Philosophy of Psychology. 4 Units.
Selected topics in the philosophy of psychology, e.g., the nature of psychological explanation, reductionism, issues in cognitive, behavioral, and neuroscience.
Same as LPS 143, PHILOS 143
Repeatability: May be taken unlimited times as topics vary
Restrictions: Philosophy majors and Psychology majors have the first consideration for enrollment.