Cognitive Science

**CGS 2301** Cognitive Science (3 semester credit hours) An introduction to the study of the brain and behavior from the point of view of cognitive science, including approaches from psychology, philosophy, neuropsychology, and computational modeling. Includes phenomena involving sensory systems, memory, decision making, language, and communication. (3-0) Y

**CGS 3325** Historical Perspectives on Psychology: Mind and Machines since 1600 (3 semester credit hours) Basic frames of reference in twentieth century psychology and their historical development in Western thought since 1600 with an emphasis on issues involved with minds, brains, and machines. Includes behaviorism, learning theory, artificial intelligence, and gestalt, structural and cognitive approaches. Prerequisite: **PSY 2301** or **CGS 2301**. (Same as **PSY 3360**) (3-0) Y

**CGS 3340** Experimental Projects in Cognitive Science (3 semester credit hours) Laboratory and field experience in designing and conducting research, with a major emphasis on writing research reports. Credit cannot be received for more than one of the following: **CLDP 3394**, **CLDP 3494**, or (**PSY 3393** or **CGS 3340**). Prerequisite: **PSY 3392** or **PSY 3490**. (Same as **PSY 3393**) (3-0) S

**CGS 3342** Cognitive and Neural Modeling Laboratory (3 semester credit hours) A historical introduction to the major classes of supervised, unsupervised, and reinforcement machine learning algorithms from a behavioral science and neuroscience perspective with applications to artificial intelligence, computational neuroscience, and mathematical psychology. Students study the behavior of these algorithms using a variety of simulation modeling environment. (3-0) T

**CGS 3361** Cognitive Psychology (3 semester credit hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. Prerequisite: **CGS 2301** or **PSY 2301**. (Same as **PSY 3361**) (3-0) S

**CGS 4193** Internship Preparation (1 semester credit hour) Students learn the process and requirements for successful internships. Students are guided to find an appropriate match for field experience in applied settings to enhance their career skill sets. Instructor consent required. (Same as **CLDP 4193** and **NSC 4193** and **PSY 4193** and **SPAU 4193**) (1-0) S

**CGS 4314** Intelligent Systems Analysis (3 semester credit hours) This advanced machine learning course covers mathematics essential for the analysis and design of unsupervised, supervised, and reinforcement machine learning algorithms including deep learning neural network models formulated within a statistical empirical risk minimization framework. Topics include: advanced vector and matrix calculus, stochastic sequences of mixed random vectors, Bayesian nets, and Markov fields. Unsupervised, supervised, and reinforcement machine learning applications are emphasized through the course. Prerequisites: ((**MATH 2414** or **MATH 2419**) and (**CS 3341** or **SE 3341**)) and MATH2418 or instructor consent required. (Same as **CS 4314**) (3-0) T

**CGS 4315** Intelligent Systems Design (3 semester credit hours) This advanced machine learning course covers mathematics essential for the analysis and design of unsupervised, supervised, and reinforcement machine learning algorithms including deep learning neural network models formulated within a statistical empirical risk minimization framework. Topics include: convergence analysis of adaptive and batch learning algorithms, convergence analysis of Monte Carlo Markov Chain inference algorithms, bootstrap sampling methods, and the statistical analysis of generalization performance. Unsupervised, supervised, and
reinforcement machine learning applications are emphasized throughout the course. Prerequisite: CGS 4314 or CS 4314. (Same as CS 4315) (3-0) T

CGS 4320 Psychology of Reasoning (3 semester credit hours) This course will examine reasoning from multiple perspectives including types of thinking and reasoning, comparisons across species, and lifespan development. There is a joint emphasis on the definition of reasoning from a cognitive perspective and from a neuroscience perspective. Prerequisite: PSY 2301 or PSY 3361. (Same as PSY 4320) (3-0) Y

CGS 4352 Human-Computer Interaction I (3 semester credit hours) Broad overview of how human-computer interaction (HCI) informs the user-centered design (UCD) process. Practical experience in the core methods of user experience design and research throughout the product development cycle. (Same as CS 4352) (3-0) Y

CGS 4353 Human-Computer Interaction II (3 semester credit hours) Exploration of advanced topics in human-computer interaction (HCI) in both research and industry. Practical experience with latent methods in user experience (UX) design and research that build upon core methods introduced in CGS 4352. Typically used in the design of usable systems. Prerequisite: CGS 4352 or CS 4352. (Same as CS 4353) (3-0) Y

CGS 4359 Cognitive Neuroscience (3 semester credit hours) Examines how modern cognitive neuroscientists explore the neural underpinnings of perception, memory, attention, language and emotion. Investigates how the brain-bases of these functions are uncovered by ingenious observations of clinical populations (including brain-damaged and schizophrenic patients), animal and human electrophysiological techniques, and powerful new functional neuroimaging tools. Prerequisite: PSY 2301. (Same as NSC 4359 and PSY 4359) (3-0) S

CGS 4362 Perception (3 semester credit hours) Considers the processes by which the individual gathers information from the external world, the physiological basis of those processes, and how they develop throughout the life span of the individual. Prerequisite: CGS 2301 or PSY 2301. (Same as PSY 4362) (3-0) R

CGS 4364 Attention and Memory (3 semester credit hours) Factors influencing the capacity to pick up, organize, and remember complex information. Prerequisite: (CGS 3361 or PSY 3361) or instructor consent required. (Same as PSY 4364) (3-0) R

CGS 4385 Neuropsychology (3 semester credit hours) This course is a comprehensive introduction of the relationship between brain and behavior. Topics include the foundations of neuropsychology, the brain's organization and functional systems, and neuropsychological perspectives of memory, attention, language, emotion, and spatial functions, and their related disorders. Prerequisite: NSC 3361. (Same as NSC 4385 and PSY 4385) (3-0) Y

CGS 4386 Adult Development and Aging (3 semester credit hours) This course is designed to provide an overview of theories, methods, and research on the psychological processes during adulthood and aging. A selection of topics will be covered to understand the nature of and multiple influences on development throughout the adult lifespan. Prerequisite: PSY 2301. (Same as PSY 4386 and SPAU 4386) (3-0) Y

CGS 4389 Developmental Cognitive Neuroscience (3 semester credit hours) Course examines how the human brain develops and changes throughout childhood to support a range of essential cognitive processes. The course will include the following topics: the development of the neuronal structures underlying imperative cognitive processes including: vision, attention, social cognitive, memory, language, and planning; how genetic and environmental factors interact to shape brain networks underlying human behavior; methods for studying cognitive neuroscience across the lifespan, including fMRI, EEG, rTMS, and DTI; and neuroplasticity and the changing brain throughout development. Prerequisite: PSY 2301. (Same as
CLDP 4389 and NSC 4389 and PSY 4389 (3-0) Y

CGS 4390 Directed Research and Writing (3 semester credit hours) Student conducts research under weekly faculty supervision and completes assigned laboratory projects and written activities with feedback. May be repeated for credit as topics vary (9 semester credit hours maximum for CGS 4390 and CGS 4V98 combined). Instructor consent required. (3-0) S

CGS 4391 Writing and Independent Study (3 semester credit hours) Student studies advanced topics under weekly faculty supervision and completes assigned readings, independent readings, and written paper. May be repeated for credit as topics vary (6 semester credit hours maximum for CGS 4V99 and CGS 4391 combined). Instructor consent required. (3-0) S

CGS 4394 Internship in Cognitive Science (3 semester credit hours) Students earn course credit for field experience in an applied setting. Requires working at least 8 hours per week at an approved community agency or business of the student's choice. Students keep daily job diaries, attend one class meeting per month, and write brief papers relevant to their experiences. Open to students in good academic standing with a GPA of at least 2.500 who have reached junior or senior standing (more than 53 hours). Apply for placements on the BBS website. Credit/No Credit only. Instructor consent required. (Same as CLDP 4394 and NSC 4394 and PSY 4394 and SPAU 4396) (3-0) S

CGS 4395 Co-op Fieldwork (3 semester credit hours) Students earn course credit for field experience in an approved business or government setting. Requires working at least 8 hours per week. Students will keep a journal of their workplace experience, maintain contact with the instructor, and prepare a written report that focuses on the accomplishments and insights gained through their co-op experience. Open to students in good academic standing with a GPA of at least 2.500. Credit will not be awarded retroactively. Apply for placements through the Career Center office. Credit/No Credit only. May be repeated for credit (6 semester credit hours maximum). Instructor consent required. (Same as CLDP 4395 and PSY 4395) (3-0) S

CGS 4397 Thesis Research (3 semester credit hours) An independent study in which the student writes a thesis under faculty supervision. Instructor and Associate Dean consent required. (3-0) S

CGS 4V75 Honors Seminar (1-3 semester credit hours) A course for students enrolled in the BBS Honors Program (minimum 3.500 GPA and 30 graded hours at UT Dallas) who will conduct undergraduate thesis research in BBS. The seminar addresses issues related to research activities. This course is required for students seeking BBS School Honors. Offered only in spring semester. Credit cannot be received for more than one of the following: CGS 4V75, CLDP 4V75, NSC 4V75, PSY 4V75 or SPAU 4V75. Director of the Honors Program consent required. ([1-3]-0) Y

CGS 4V90 Special Topics in Cognitive Science (1-3 semester credit hours) May be repeated for credit as topics vary (9 semester credit hours maximum). ([1-3]-0) R

CGS 4V96 Teaching Internship (1-3 semester credit hours) Students work individually with faculty member in preparing and presenting course materials and tutoring students. Must have completed the relevant course with a grade of at least B and have a UT Dallas GPA of at least 3.000. Credit/No Credit only. May be repeated for credit (6 semester credit hours maximum). Instructor and Associate Dean consent required. ([1-3]-0) S

CGS 4V98 Directed Research (1-3 semester credit hours) Student assists faculty with research projects or conducts a research project under weekly faculty supervision. Credit/No Credit only. May be repeated for credit as topics vary (9 semester credit hours maximum for CGS 4390 and CGS 4V98 combined). Instructor consent required. ([1-3]-0) S
**CGS 4V99** Individual Study (1-3 semester credit hours) Student studies advanced topics under weekly faculty direction. Credit/No Credit only. May be repeated for credit as topics vary (6 semester credit hours maximum for *CGS 4V99* and *CGS 4391* combined). Instructor consent required. ([1-3]-0) S