Behavioral and Brain Sciences

**HCS 5314 (ACN 5314)** Computational Modeling Methods in Behavioral and Brain Sciences (3 semester credit hours) Computational Neuroscience, Cognitive Neural Modeling, Machine Learning, and Mathematical Psychology modeling methodologies are introduced through the use of computer-based simulation modeling experiments. Emphasizes creative applications of these research methodologies. Prerequisites: BBSC majors only and department consent required. (3-0) T

**HCS 6302** Issues in Behavioral and Brain Sciences - Part I (3 semester credit hours) Doctoral proseminar on current theory and research in cognition and neuroscience, communication sciences and disorders, and psychological sciences. Pass/Fail only. Prerequisite: BBS doctoral students only or instructor consent required. (3-0) Y

**HCS 6310 (ACN 6310)** Fundamentals of Functional Brain Imaging (3 semester credit hours) This course covers topics such as principles of tracer techniques, neuroimaging instrumentation, safety issues, brain physiology (perfusion, metabolism, and receptor function), image processing and analysis, fundamentals of SPECT, PET and fMRI, and critical evaluation of the functional neuroimaging literature. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 6312 (ACN 6312 and PSYC 6312)** Research Methods in Behavioral and Brain Sciences - Part I (3 semester credit hours) This course focuses on applying, understanding, and interpreting various ANOVA-related statistical techniques in a behavioral science context. Students learn the frameworks for hypothesis testing and effect size estimation. The course provides students with an understanding of the interrelationships among statistical techniques, and computer skills required for data analyses. Students without the necessary background knowledge of basic statistics and experimental design will be required to take PSY 3392 before registering for ACN 6312. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 6313 (ACN 6313 and PSYC 6313)** Research Methods in Behavioral and Brain Sciences - Part II (3 semester credit hours) This course focuses on applying, understanding, and interpreting regression-related statistical techniques in a behavioral science context. The course provides students with increased conceptual understanding of topics within regression (e.g., hierarchical regression analysis, multiple regression with continuous and categorical predictors, regression diagnostics), along with computer skills required for data analyses. Prerequisites: (ACN 6312 or HCS 6312 or PSYC 6312) and department consent required. (3-0) Y

**HCS 6315** Grant Writing for Researchers (3 semester credit hours) Identifying funding sources appropriate to research needs, formulating a research plan, generating specific aims and a methodological design to address those aims, presentation of preliminary results to show the feasibility of the proposed work, and use of appropriate reference citations. Prerequisites: BBSC majors only and instructor consent required. (3-0) Y

**HCS 6316 (ACN 6316 and PSYC 6316)** Research Methods in Behavioral and Brain Sciences - Part III (3 semester credit hours) Applying, understanding, and interpreting various advanced multivariate statistical techniques in brain and behavioral science contexts. Includes principal component analyses, simple and
multiple correspondence analyses, partial least square methods, multi-table analyses, discriminant analyses, and structural equation modeling. May be repeated for credit as topics vary (6 semester credit hours maximum). Prerequisite: BBSC majors only. (3-0) R

HCS 6317 (PSYC 6317) Research Methods in Psychology (3 semester credit hours) This course overviews research methods in psychological science. Students learn to design, conduct, and evaluate psychological research. Students will learn to critically evaluate the methodology and conclusions of existing and proposed research. Students will develop a formal research proposal and will learn about the process of grant submission and peer review. Students will also learn about issues related to professionalism, diversity, and ethics in the conduct and publication of research in psychology. Prerequisite: BBSC majors only and department consent required. (3-0) Y

HCS 6319 Scientific Writing (3 semester credit hours) This course covers the fundamentals of effective scientific manuscript writing and de-constructs the peer-review process. Instruction, exercises and assignments will focus primarily on the process of writing and publishing scientific manuscripts. The course will be simultaneous (1) lectures / discussions / class exercises on how to write effectively, concisely, and clearly, and, (2) preparation of an actual scientific manuscript to be ready for submission to a scientific journal at the end of the semester, which will involve one-on-one editing sessions with the instructor. Students must have data available, analyzed, and prepared for a writing project (e.g., first year project) prior to enrollment in this course which is open only to BBS doctoral students. May be repeated for credit as topics vary (6 semester credit hours maximum). Prerequisite: BBS doctoral students only. (3-0) Y

HCS 6322 (ACN 6322) Computational Modeling Methods for Language Understanding (3 semester credit hours) Probabilistic methods for modeling natural language understanding and the statistical analysis of language data. Use of the MATLAB and PERL computer languages for instantiating specific knowledge-based computational theories of natural language understanding with a focus on information retrieval and text mining methods. Emphasizes creative applications of these research methodologies. Prerequisites: BBSC majors only and department consent required. (3-0) T

HCS 6327 (PSYC 6327) Personality (3 semester credit hours) Survey of trait, biological, social-cognitive, analytic, and learning theory approaches to the study of personality. Emphasis on intensive exploration of modern theoretical and empirical work. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6330 (ACN 6330 and PSYC 6330) Cognitive Science (3 semester credit hours) Cognitive, computational, and neural processing approaches to understanding perception, memory, thought, language, and emotion. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6331 (ACN 6331 and PSYC 6331) Cognitive Development (3 semester credit hours) Survey of cognitive development theories and research in a variety of domains including perception, memory, language, and problem solving. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6332 (ACN 6332 and PSYC 6332) Perception (3 semester credit hours) Psychophysical, neurophysiological, and computational foundations of sensation and perception. Basic senses of vision, audition, chemoreception, and tactile processing, with emphasis on understanding the processes that take us from neurons to perception and action. Prerequisites: BBSC majors only and department consent required. (3-0) R
HCS 6333 (ACN 6333 and PSYC 6333) Memory (3 semester credit hours) Research and theory on the acquisition, representation, and retrieval of information by the mind/brain. Includes information processing and neuropsychological perspectives. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 6334 (ACN 6334) Attention (3 semester credit hours) Theory and evidence on the study of attention especially in human vision and audition. Includes perceptual learning, information processing, and neuropsychological approaches. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 6336 Principles of Developmental Neuroscience (3 semester credit hours) Molecular and cellular events underlying neuronal differentiation, axon guidance, synapse formation, neurotrophic factors, and neural death, with special emphasis on activity-dependent plasticity and its role in generating and maintaining the extraordinary precision of connections found in the nervous system. Prerequisites: BBSC majors only and department consent required. (3-0) T

HCS 6338 (ACN 6338 and PSYC 6338) Functional Neuroanatomy (3 semester credit hours) An introduction to human neuroanatomy organized by major brain system. Function of the neuroanatomy of each major system and relation to neurological disorders associated with damage to the neuroanatomy of the system. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6340 (ACN 6340) Cellular Neuroscience (3 semester credit hours) Basic neural biology and physiology and principles of synaptic transmission. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6341 Genes, Brain, and Behavior (3 semester credit hours) Neuroscience is a remarkable interdisciplinary field requiring analysis at multiple levels: behavioral, electrophysiological, and molecular. This course will focus on the basic cellular and molecular mechanisms that control neuronal functioning, with an emphasis on the regulation of gene expression (transcription/translation) via genetic, epigenetic and synapse to nucleus signaling mechanisms. Relevant examples will reference: regulating cellular excitability, LTP, learning and memory, psychiatric and neurological diseases. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6343 Neurobiology of Learning and Memory (3 semester credit hours) Current research and theory on modifications in the central nervous system that contribute to the processes of learning and memory. Includes an overview of different forms of learning as assessed in model systems, with extensive review of anatomical, cellular, and molecular changes underlying neuronal and behavioral plasticity. Prerequisites: (ACN 6346 or HCS 6346 or PSYC 6346) and department consent required. (3-0) Y

HCS 6346 (ACN 6346 and PSYC 6346) Systems Neuroscience (3 semester credit hours) Integrative systems level study of the nervous system. Aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, biological homeostasis, and higher cognitive functions. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6347 (ACN 6347) Intelligent Systems Analysis (3 semester credit hours) Mathematical tools for investigating the asymptotic behavior of both deterministic and stochastic nonlinear optimization methods for machine learning algorithms. Topics include: artificial neural network architectures, Lyapunov stability theory, nonlinear optimization theory, stochastic approximation theory, and Monte Carlo Markov Chain methods such as the Metropolis-Hastings algorithm. Emphasizes development of advanced analytic skills
and mathematical reasoning abilities. Prerequisites: (Linear algebra, multivariable calculus, and STAT 3341 or equivalent) and BBSC majors only and department consent required. (3-0) T

**HCS 6348 (ACN 6348)** Neural Net Mathematics (3 semester credit hours) Vector calculus and vector calculus-based probability theory with machine learning and artificial neural network modeling applications. Emphasizes development of advanced analytic skills and mathematical reasoning abilities. Intended to provide mathematics preparation for ACN 6347, HCS 6347, ACN 6349, and HCS 6349. Prerequisites: (Linear algebra, multivariable calculus, and STAT 3341 or equivalent) and BBSC majors only and department consent required. (3-0) T

**HCS 6349 (ACN 6349)** Intelligent Systems Design (3 semester credit hours) Probabilistic and statistical modeling tools for the design and evaluation of artificially intelligent deterministic and stochastic nonlinear dynamical systems for the purpose of developing computational models in the field of cognitive-neuroscience and developing machine learning algorithms in the field of artificial intelligence. Topics include probabilistic interpretations of artificial neural network and machine learning algorithms and asymptotic statistical theory for parameter estimation, model selection, specification analysis, and hypothesis testing. Prerequisites: (ACN 6348 or HCS 6348 or instructor consent required) and BBSC majors only. (3-0) T

**HCS 6350 (PSYC 6350)** Social Development (3 semester credit hours) Foundations of social and personality development. Includes survey of psychodynamic, social learning, behavior genetic, family systems, and social-cognitive approaches to the study of attachment, parenting, aggression, peer relationships, sex typing, and other contemporary issues. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 6357 (PSYC 6357 and HDCD 6319)** The Developing Child: Infants and Toddlers (3 semester credit hours) Theories of infant development in multiple content domains (cognitive, social, motor, language, physical) from conception to 24 months. Milestones of development and the understanding of relationship across domains and viewing the child as a "system" within the relationships. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 6359 (HDCD 6320 and PSYC 6320)** The Developing Child: Toddler and Preschool Years (Two to Five Years) (3 semester credit hours) Relevant developmental theories and processes as well as skills acquired in motor, sensory-perceptual, cognitive, and social domains. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 6360** Neural Basis of Speech-Sound Processing (3 semester credit hours) Basic neural mechanisms of speech-sound processing. Discussion of research articles. Prerequisite: BBSC majors only. (3-0) R

**HCS 6363 (ACN 6363)** Text Comprehension Seminar (3 semester credit hours) Current readings in the field of text comprehension and memory. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and instructor consent required. (3-0) T

**HCS 6364** Cortical Plasticity (3 semester credit hours) Basic principles of neural plasticity with special emphasis on cortical plasticity related to development, recovery from injury, and learning. Classic and recent research articles will be discussed. Prerequisite: BBSC majors only. (3-0) R

**HCS 6366** Seminar in Auditory Cortical Processing (3 semester credit hours) Basic principles of neural
information processing with special emphasis on the central nervous system processes underlying hearing and speech perception. May be repeated for credit (12 semester credit hours maximum). Prerequisite: BBSC majors only. (3-0) T

HCS 6367 (ACN 6367 and PSYC 6367) Speech Perception (3 semester credit hours) Current topics and theories in speech perception. Topics include the acoustic correlates of speech sounds and the problem of invariance, the perception of speech under adverse conditions, the effects of hearing impairment, and models of speech perception. Prerequisites: BBSC majors only. (3-0) R

HCS 6368 (ACN 6368 and PSYC 6368) Language Development (3 semester credit hours) Advanced study of normal oral language development. The goals of this course are to consider the developmental trajectories of the different components of language; to consider the varied and critical roles of language in human development; to understand the impact of culture, different languages, child factors and the environment on development; and to be introduced to the theoretical perspectives driving research and thinking in this area of inquiry. Prerequisite: BBSC majors only. (3-0) Y

HCS 6372 (ACN 6372) The Neuroscience of Pain (3 semester credit hours) A systems-oriented course covering the anatomical and physiologic basis of pain. The course describes the basic features of neural processing of pain signals in the spinal cord and brain, the anatomy and the function of the descending systems that can control transmission of pain signals, and peripheral and central sensitization. The physiological and molecular basis for treatment of pain is discussed. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6373 (ACN 6373) Intraoperative Neurophysiological Monitoring (IONM) Part I (3 semester credit hours) Part 1 of the course covers the anatomical and physiological basis for the use of electrophysiological techniques in the surgical operating room and clinically in diagnosis of disorders affecting the nervous system. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6374 (ACN 6374) Intraoperative Neurophysiological Monitoring (IONM) Part II (3 semester credit hours) Part II covers the use of recordings of neuro-electric brain potentials and their interpretation during surgical operations and clinically for diagnostic purposes. The use of electrophysiological methods for guiding implantation of stimulating electrodes deep in the brain and for assisting the surgeon in certain operations are also described. Prerequisites: (ACN 6373 or HCS 6373) and departmental consent required. (3-0) Y

HCS 6376 (PSYC 6376) Social Psychology (3 semester credit hours) This course is a graduate-level introduction to the field of social psychology. The primary objective of this class is to acquaint students with some of the major topics and research methods in social psychology. Topics may include social cognition and self-justification, biases in judgment, attitudes and persuasion, conformity, compliance, group dynamics, prejudice and stereotyping, interpersonal attraction and relationships, aggression and altruism, cultural diversity, and applications relevant to these aspects of the human experience. Special attention to research paradigms of interest to students developing their own empirical work. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6379 (COMD 6379) Neurological Basis of Language Development (3 semester credit hours) Study of the development of the pre- and postnatal brain and how it relates to the acquisition and development of language throughout the lifespan. Prerequisites: BBSC majors only and department consent required. (3-0)
HCS 6388 (ACN 6388) MATLAB for Brain Sciences (3 semester credit hours) Introduction to MATLAB computer programming. Covers the use of the MATLAB programming language for the purpose of stimulus generation, behavioral data analysis, statistical analyses, and generation of publication quality figures. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 6389 (ACN 6389) Speech Perception Laboratory (3 semester credit hours) Introduction to the field of speech processing by computer, with primary application to research techniques in the study of speech perception. Prerequisites: BBSC majors only and department consent required. (0-9) T

HCS 6391 Seminar on Preliteracy Development (3 semester credit hours) Selected topics and current research in preliteracy development. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 6392 Seminar in Theories of Language Acquisition (3 semester credit hours) A survey and critical exploration of current theories of language acquisition and more general theories of cognitive development that have been applied to language development. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 6395 (ACN 6395 and PSYC 6395) Cognitive Psychology (3 semester credit hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 6399 (ACN 6399 and PSYC 6399) Research Ethics and Scientific Integrity (3 semester credit hours) An interactive, intensive course designed to cover critical issues related to human subjects, animal welfare, research design, accountability of scientific actions and fraud. Course designed for individuals intending research careers in academia or industry. Prerequisite: BBSC majors only. (3-0) Y

HCS 7121 Graduate Seminar in Systems Neuroscience (1 semester credit hour) The purpose of this course is to give PhD students in Systems Neuroscience a forum for training in oral presentation skills. Students will be expected to present their research findings in this class in a variety of formats. In addition to presentations, the course will include grant writing with a focus on National Institutes of Health (NIH) grant applications and the process of responding to critiques. Pass/Fail only. May be repeated for credit (10 semester credit hours maximum). Department consent required. (1-0) S

HCS 7309 (COMD 7309) Neural Correlates of Human Cognition: Lesion-Deficit Models (3 semester credit hours) Correlation of brain lesions with cognitive deficits provides a human brain map of the essential anatomy underlying specific cognitive functions. The areas of cognition to be covered using this model include language, episodic memory, semantic memory, working memory, aspects of visuospatial functions, and higher-order motor planning. This knowledge base provides a key framework to combine with the findings of functional neuroimaging (fMRI, PET) in understanding how humans think. Cognitive deficits in patients (e.g., amnesia, aphasia, etc.) will be explained within this framework. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 7310 Advanced Research Methods (3 semester credit hours) Advanced methods of inquiry and analysis unique to cognition and neuroscience, communication sciences and disorders, or psychological sciences. May be repeated for credit as topics vary. Prerequisites: HCS 6313 and department consent
HCS 7311 Family Psychology (3 semester credit hours) Theory and research on family systems, including topics related to family interactions and relationships within the family. Prerequisites: BBSC majors only and instructor consent required. (3-0) R

HCS 7316 Statistical Analysis of Brain Imaging Data (3 semester credit hours) Covers analysis of brain imaging data obtained from diverse techniques such as PET, SPECT, fMRI, or EEG. Includes standard analyses with packages such as SPM02 or AFNI as well as pattern analysis approaches (e.g., partial least squares methods, regression, correspondence, discriminant, and principal component analyses). Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 7317 Longitudinal Research Methods (3 semester credit hours) Advanced methods course covering issues related to the design and analysis of multiple waves of data over time. Topics include measurement and attrition, linear and nonlinear latent growth curve modeling, and time-varying and invariant predictors. Designed for students interested in development, variability in processes over time, or experimental change. Prerequisites: HCS 6313 and department consent required. (3-0) R

HCS 7318 Healthy Aging and Neuropathology (3 semester credit hours) This class focuses on understanding how normal age-related deterioration in brain structure and function affects cognition as well as the slow process whereby healthy brains transition to Alzheimer's disease and other cognitive disorders. The course focuses on specific topics each week with an emphasis on understanding compensatory processes that mask disease as well as what the catalysts are for transition to pathology. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 7319 Molecular Target Discovery for Neuroscience and Neurological Disorders (3 semester credit hours) Neurological disorders are prominent in the population but poorly treated by existing therapeutics. The purpose of this course is to familiarize students working in research environments with the process of identifying and vetting targets for the potential treatment of neurological disorders. Research manuscripts from the recent literature will be assigned, and students will be expected to present data in these papers to their peers and critically discuss findings in the papers. Discussions will focus on future directions for target discovery based on the presented work. Prerequisites: (HCS 6340 or HCS 6346) and departmental consent required. (3-0) R

HCS 7320 Advanced Research Methods in Behavioral and Brain Science and Data Analysis Using R (3 semester credit hours) R programming language (including writing functions and using special packages). Using the R programming language to analyze standard designs used in Behavioral and Brain Science: ANOVA, MANOVA, principal component analysis, correspondence analysis, discriminant analysis, partial least methods, multi-table analysis, and various other statistical techniques. Includes designing and creating publication ready graphics, analysis of experimental data and surveys. May be repeated for credit (9 semester credit hours maximum). Prerequisites: (ACN 6312 or HCS 6312 or PSYC 6312) and department consent required. (3-0) Y

HCS 7329 Functional Brain Imaging Practica (3 semester credit hours) Application of learned skills to short research projects in small group format. Projects include: 1) acquisition of new data in SPECT, PET or fMRI in association with ongoing funded research; 2) mentored analysis of existing data sets; and 3) experimental design projects with a full experimental protocol, including informed consent procedures,
acquisition parameters and data analysis plans. Prerequisites: BBSC majors only and department consent required. (3-0) R

**HCS 7330 (ACN 7330)** Advanced Functional Brain Imaging (3 semester credit hours) This course explores more in-depth topics such as neuroimaging detection systems, clinical applications of functional neuroimaging, experimental design, statistical techniques in image analysis and reviews of pertinent literature using functional brain imaging to illuminate various cognitive and perceptual processes, such as language, memory, hearing and vision. Prerequisites: BBSC majors only and department consent required. (3-0) R

**HCS 7333 (ACN 7335)** Computational Neuroscience (3 semester credit hours) Introduction to state-of-the-art computer methods for simulation of biologically realistic neuronal dynamics. Students must demonstrate computer skills. Prerequisites: BBSC majors only and department consent required. (3-0) R

**HCS 7334** Affective Neuroscience (3 semester credit hours) Current studies and theories of the biological basis of emotion and affective behaviors. The interactions of emotional processes with other brain functions. Topics covered may include anxiety, depression, stress, and fear as well as hedonically positive emotional states. Prerequisites: (ACN 6346 or HCS 6346 or PSYC 6346) and department consent required. (3-0) R

**HCS 7337** Advanced Neuroscience Lab Methods (3 semester credit hours) Intensive hands-on training and exposure to neuroscience laboratory methods such as neurophysiology, neuropharmacology, and behavioral observation approaches to understanding the biology of behavior. Experimental design, analysis and science writing are emphasized. May be repeated for credit as topics vary (6 semester credit hours maximum). Prerequisites: (ACN 6346 or HCS 6346 or PSYC 6346) and HCS 7343 or instructor consent required. (3-0) R

**HCS 7338** Brain Connectivity (3 semester credit hours) Systems and cognitive neuroscience based approach towards measuring and understanding patterns of brain connectivity in humans and non-human animals. Prerequisites: (HCS 6346 or HCS 6338) and instructor consent required. (3-0) R

**HCS 7340 (COMD 7340)** Research in Communication Sciences and Disorders: What, Why, and How (3 semester credit hours) This course is designed to introduce doctoral students to scientific reasoning and methods using examples from the astonishing variety of research on human communication and its disorders. The goal is to provide students with conceptual tools (e.g., appraising research quality, matching research questions with research designs) and practical tools (e.g., managing literature searches, visualizing data) that they will need to transform an area of interest into a credible and feasible research study. Although the course includes basic statistical concepts that are useful in planning many research studies (e.g., relationships among Type I and Type II errors, effect size, and sample size), the emphasis is on statistical reasoning, not on specific statistical procedures. Prerequisites: BBSC majors only and department consent required. (3-0) Y

**HCS 7343 (ACN 7343)** Neuropharmacology (3 semester credit hours) Biology of neurotransmission in the central nervous system. Includes ionotropic and metabotropic coupling of all known classes of receptors to both their cellular and systemic effects. Clinical efficacy, side effects, and other issues related to drug use and abuse are covered. Prerequisites: (ACN 6340 or HCS 6340 or ACN 6346 or HCS 6346 or PSYC 6346) and department consent required. (3-0) T
HCS 7351 Aging and the Nervous System (3 semester credit hours) Critical evaluation of research and theory concerning the impact of aging on neuronal function. Cognitive dysfunctions, dementias, and underlying neuropathologies, as well as neurophysiological and neurochemical changes that accompany normal aging. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 7352 Seminar in Language Impairments in Children (3 semester credit hours) Advanced study of language impairments in children emphasizing research issues related to these diverse clinical populations. Topics may include SLI, SCI, SELD, deafness, and autism spectrum disorder among others. May be repeated for credit as topics vary. Prerequisites: (COMD 6307 or HCS 6368) and COMD 6308 and instructor consent required. (3-0) T

HCS 7355 Seminar in Psychological Sciences (3 semester credit hours) Selected topics of current research in social or cognitive development. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 7364 Cognitive Neuroscience of Human Memory (3 semester credit hours) Seminar-based class that covers the cognitive neuroscience of human long term memory. It combines a historical perspective with discussion of current controversies and advances. Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 7371 Neuroplasticity and Its Dark Sides (3 semester credit hours) A systems-oriented course that covers the bases for expression of neuroplasticity and its involvement in the pathophysiology of certain neurological disorders. The anatomical and functional bases for some disorders of the peripheral and central nervous systems are covered as is the little known non-classical sensory pathway and its involvement in autism, chronic neuropathic pain, and some forms of tinnitus. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 7372 Seminar in Neuroscience (3 semester credit hours) Selected topics and current research in neuroscience. May be repeated for credit as topics vary. Prerequisite: BBSC majors only. (3-0) Y

HCS 7376 (HDCD 6385 and PSYC 6335) Child Psychopathology (3 semester credit hours) Major classes of childhood psychopathology manifested during infancy through adolescence. Normal personality development as a basis for identifying psychopathology. Issues of etiology, diagnosis, prognosis and social policy. Prerequisites: BBSC majors only and department consent required. (3-0) R

HCS 7379 (COMD 7379) Current Research in Autism (3 semester credit hours) Exploration of research theories related to Autism Spectrum Disorders (ASD) and the implications the disability has on an individual's learning, behavior and ability to process information. Topics in different semesters include: diagnostic classification, the evaluation process, current theoretical models, intervention models, research on potential causes and treatments, provisions for service delivery and areas of impairment. May be repeated for credit as topics vary (9 semester credit hours maximum). Prerequisites: BBSC majors only and department consent required. (3-0) Y

HCS 7382 (PSYC 7382 and HDCD 7382) Health Psychology (3 semester credit hours) Current biological, social, clinical and developmental theory and research on the psychological, social, and behavioral factors that are associated with health and well-being. The course will utilize a biopsychosocial perspective and cover topics such as stress and coping, pain, psychoneuroimmunology, health behavior, and chronic disease. Prerequisites: BBSC majors only and department consent required. (3-0) Y
**HCS 7V71** Topics in Communication Sciences and Disorders (1-6 semester credit hours) Selected topics and current research in communication sciences and disorders. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and department consent required. ([1-6]-0) R

**HCS 7V97** Directed Individual Study in Psychological Sciences (1-9 semester credit hours) Individualized program of study which may include reading, research, or other designated activities. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 7V98** Directed Individual Study in Communication Sciences and Disorders (1-9 semester credit hours) Individualized program of study which may include reading, research, implementation of clinical strategies, and/or other designated activities. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 7V99** Directed Individual Study in Neuroscience (1-9 semester credit hours) Individualized program of study which may include reading, research, or other designated activities. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V50** Doctoral Readings and Research Seminar (1-6 semester credit hours) Seminar for advanced doctoral students on current issues and research in Behavioral and Brain Sciences. Pass/Fail only. May be repeated for credit as topics vary. Prerequisites: BBSC majors only and instructor consent required. ([1-6]-0) R

**HCS 8V80** Research in Behavioral and Brain Sciences (1-9 semester credit hours) Supervised research experience. Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V87** Research in Psychological Sciences (1-9 semester credit hours) Supervised research experience. Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V88** Research in Communication Sciences and Disorders (1-9 semester credit hours) Supervised research experience. Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V89** Research in Neuroscience (1-9 semester credit hours) Supervised research experience. Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V97** Dissertation in Psychological Sciences (1-9 semester credit hours) Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V98** Dissertation in Communication Sciences and Disorders (1-9 semester credit hours) Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S

**HCS 8V99** Dissertation in Neuroscience (1-9 semester credit hours) Pass/Fail only. May be repeated for credit. Prerequisites: BBSC majors only and instructor consent required. ([1-9]-0) S