Descriptions of Courses

❒ Undergraduate course

BCS200 Laboratory in Animal Brain Anatomy and Physiology

This course introduces key experimental methods for neurophysiology and apply those tools for the study of animal physiology. The course consists of lectures, experiments, and group presentation on the neuroanatomy and physiology of human and animals.

BCS201 Biology of Neurons

This lecture aims to provide basic knowledge of neural diversities and functions. It deals with the content of basic and practical neurobiological knowledge at a level that even students who majored in human art can understand.

BCS202 Systems Neuroscience

The course offers introduction to systems neuroscience for studying principles underlying the structure and function of the nervous system. Topics include anatomy and development of functional neural circuits of sensory systems, motor system, and higher brain regions.

BCS221 Cognitive Neuroscience

This course covers basic knowledge of various cognitive functions in the brain based on the cognitive theories and experimental evidence in neuroscience and neuropsychology. This course aims to provide a fundamental framework for cognitive neuroscience to enable comprehensive thinking.

BCS222 Psychological and Behavioral Science

In this course, students will learn and discuss a wide range of multidisciplinary perspectives on understanding human behaviors in our everyday lives, including emotional and social behaviors, conscious decision making, and unconscious responses.

BCS301 Developmental Neuroscience

This lecture deals with knowledge of brain development. It aims to understand how the innate and acquired development of the brain affects the structure and function of the brain.

BCS302 Gene, Circuit, Behavior

This lecture is about a system neurobiological approach to understanding behavior. Genes provide the information needed for brain development and function, and neural circuits process empirical information to ultimately understand how genetic and environmental interactions contribute to behavior.
(Recommended topical prerequisites: BCS202 Systems Neuroscience)

BCS303 Statistics for Brain and Cognitive Sciences

The ability to apply appropriate statistical tools to data is essential for interpreting the results in brain and cognitive sciences. This course is designed to provide basic concepts and practical applications of various statistical analyses used in brain research.

BCS304 Theoretical Neuroscience

Introduction to theoretical neuroscience including modeling and simulation approaches for neural system. Topics focus on mathematical formulations and computational models of various phenomena in neuroscience research. This course prepares students for practical use and development of theories and models in their future work.
(Recommended topical prerequisites: BCS202 Systems Neuroscience, CS109 Introduction to Programming)

BCS320 Laboratory in Human Brain Anatomy and Physiology

This lecture is an experimental subject that verifies the anatomical structure and function of humans and consists of teaching lectures, student experiments, and team projects. In the first half, we learn anatomy about the functions of the human brain and body, and in the second half, we learn behavioral analysis techniques through artificial intelligence.

BCS341 Methods in Brain and Cognitive Sciences

The course focuses on various data structures related to Brain science-cognitive science-brain engineering, data analysis techniques, and learning modeling techniques to develop an ability to formulate data-driven neural principles and model-based theories.
(Recommended topical prerequisites: BCS202 Systems Neuroscience)

BCS361 Disorders and Diseases of the Nervous System

This lecture deals with the causes and symptoms of various nervous system brain diseases. We enhance our understanding of the history and classification system of brain disease research and learn the latest knowledge on the development of methodologies to treat diseases. Lectures are conducted with teaching lectures and discussions by students.

BCS401 History of Brain Science

This history class explores the exceptionally complex scientific and medical techniques and practices that have allowed practitioners to claim expertise in the brain and mind sciences over the past two centuries. It is in the obscure, peripheral, and marginal stories of the past that we can best see the emerging futures of the medicine and science of the brain and the mind. This class show that the richness of the history of the brain and mind sciences cannot and should not be reduced to a unitary, uncomplicated narrative of progressive discovery.

BCS410 Laboratory in Experimental Data Analysis and Modeling

This course offers a series of laboratories designed to give students experience with the basic tools for analyzing experimental data and for building models for systems neuroscience research. Topics includes analysis techniques for neurophysiological, neuroimaging data, and simulation techniques of single and population neuron models.

(Recommended topical prerequisites: BCS202 Systems Neuroscience, CS109 Introduction to Programming)

BCS421 Philosophical Issues in Brain and Cognitive Sciences

This lecture focuses on historically significant philosophical issues in cognitive brain science. It deals with the knowledge of the view of the mind from the Greek and Roman times to the present day and the mind–body problems derived from them, the issues of consciousness, and the problems of free will.

BCS441 How AI and the Brain Work

The course focuses on linear models, shallow networks, and neuroscience of deep learning to understand commonalities and differences between artificial and biological neural networks, and to gain a better insight into the fundamental issues of intelligence.

(Recommended topical prerequisites: 25.110 Linear Algebra for Data Science)

BCS442 Principles of Brain Engineering

The course focuses on advanced technologies for brain analysis and engineering, including optogenetics, noninvasive brain imaging and stimulation, nanotechnologies, stem cells and tissue engineering, and advanced molecular and structural imaging technologies to investigate and change brain structure and function.

(Recommended topical prerequisites: 25.110 Linear Algebra for Data Science)

BCS462 History of Psychiatry and Neurology

The History of Psychiatry and Neurology class introduces the history of investigation of psychiatric and neurological disorders by psychiatrists and neurologists over the past two centuries. It also introduces how our society has dealt with mental disorders such as dementia, schizophrenia, and depression, and has violated their human rights, such as social isolation and reckless surgery. As psychology develops and our understanding of the brain deepens, we introduce the process of psychiatry treating brain diseases in a scientific way. Classical papers of innovative research that have led to the development of psychiatry will be read and discussed together.

BCS481 Special Topics in Brain and Cognitive Sciences

This lecture deals with specific topics that were not covered in the department's existing courses among the broad topics of brain and cognitive science. Classes consist of lectures by professors and presentations and discussions by students. If it is conducted more than 3 times and is operated stably, it can be considered as a formal course.

BCS482 Current Topics in Brain and Cognitive Sciences

This lecture deals with recent hottest topics that were not covered in the department's existing courses among the broad topics of brain and cognitive science. Classes consist of lectures by professors and presentations and discussions by students. If it is conducted more than 3 times and is operated stably, it can be considered as a formal course.

BCS490 (BS)Thesis Research

Students work either alone or as a team to conduct a research project and present its results as a thesis. Students can join an advisor's research projects, or learn practical problem solving techniques, as well as research idea development, project management skills and technical writing (Recommended topical prerequisites: BCS495 Individual Study)

BCS495 (BS)Individual Study

This course is to allow a student interested in a specific topic to work with faculty and conduct research in one's area of interest. At the beginning of a semester, a student must discuss a research topic with faculty, and submit a study plan.

BCS496 Semina(BS): departmental colloquium

We invite promient researchers who have made important research achievements in the fields of brain and cognitive science, such as neurobiology, cognitive science, theoretical neuroscience, brain engineering, and brain medicine, to introduce the research results and share the research process. It will be a valuable time for both professors and students to understand the latest research results and learn the research methods of researchers.

❒ Graduate course

BCS501 Molecular and Cellular Neurobiology

This lecture provides knowledge and research methodology on brain renal function in molecular and cellular units. It aims to understand the process of controlling the physiology and function of various nerves through intracellular signaling and protein interaction.
(Recommended topical prerequisites: BCS201 Biology of Neurons)

BCS502 Computational Cognitive Science

This course introduces computational theories of human cognition. Topics cover computational frameworks including principles of learning and inference, representation of information, probabilistic models with Bayesian inference, and causal reasoning.
(Recommended topical prerequisites: BCS221 Cognitive Neuroscience)

BCS503 Neural Circuits for Cognition

This course provides understanding of functional organization of neural circuits in the visual and auditory systems that transform sensory stimuli into signals in the nervous system for cognition. Introduces mechanisms of how the neural circuits convert sensory signals into inferences about the external world.
(Recommended topical prerequisites: BCS202 Systems Neuroscience)

BCS504 Neural Computation

This course presents the parallel and distributed nature of neural information processing in single neurons and neural networks. Explores the biologically mechanisms and principles that underlie neural computing including stochastic neural computing, learning rules, attractor networks, functional maps, feedback and recurrent interactions.
(Recommended topical prerequisites: BCS304 Theoretical Neuroscience)

BCS505 Neurogenetics

This lecture deals with the origins and history of neurogenetics with the aim of understanding how genetic information controls brain function and development, ultimately affecting brain health and brain disease.
(Recommended topical prerequisites: BCS201 Biology of Neurons)

BCS506 Quantitative Methods and Computational Models in Neuroscience

This course provides theoretical background and practical skills needed to study neural systems and analyze neurophysiological data at the cellular, systems and cognitive levels. Topics include understanding and development of mathematical tools for quantitative analyses of neural data and computational techniques of model simulation.
(Recommended topical prerequisites: BCS304 Theoretical Neuroscience)

BCS507 Structural Organization and Development of the Nervous System

This lecture systematically deals with the structure and knowledge of the nervous system. It aims to understand the function of the brain to interact with various body systems to maintain body homeostasis.

BCS521 Evolutionary Psychology

What is our connection with other life forms? What are the mechanisms of mind that define what it means to be a human being? Evolutionary psychology is a revolutionary new science, a true synthesis of modern principles of psychology and evolutionary biology. This class introduces human behavior from an evolutionary perspective, providing students with the conceptual tools needed to study evolutionary psychology and apply them to empirical research on the human mind. This class contains expanded coverage of cultural evolution, with a culture-gene co-evolution, additional studies discussing interbreeding between modern humans and Neanderthals, expanded discussions of evolutionary hypotheses that have been empirically disconfirmed. We show a wealth of student-friendly pedagogy including critical-thinking questions and case study boxes designed to show how to apply evolutionary psychology to real-life situations.

BCS522 Language in the Mind and Brain

What biological factors make human communication possible? How do we process and understand language? How does brain damage affect these mechanisms, and what can this tell us about how language is organized in the brain? The field of neurolinguistics seeks to answer these questions, which are crucial to linguistics, psychology and speech pathology alike. This class introduces the central topics in neurolinguistics: speech recognition, word and sentence structure, meaning, and discourse – in both 'normal' speakers and those with language disorders. It moves on to provide a balanced discussion of key areas of debate such as modularity and the 'language areas' of the brain, 'connectionist' versus 'symbolic' modelling of language processing, and the nature of linguistic and mental representations.

(Recommended topical prerequisites: BCS221 Cognitive Neuroscience)

BCS523 Principles of Cognitive Neuroscience

This course is an advanced course for graduate students. In the first part, this course provides basic knowledge about principles and neural bases for major issues of cognitive neuroscience, and in the second part, in-depth knowledge on the selected topics and opportunities for discussion about the topics.

(Recommended topical prerequisites: BCS221 Cognitive Neuroscience)

BCS524 The Computer and the Mind

This course is designed to discuss one of the important questions in cognitive science: what is consciousness, can a computer, an artificial information processing device, have mind, and what are the limitations of artificial intelligence. In this class, to answer these questions, we firstly define

consciousness, intelligence, mind, emotion, reasoning, creativity, etc., and investigate their essences, and explore how humans were able to obtain it. Finally, we should discuss whether a computer can have it from various perspectives.

BCS541 Neuroscience-inspired AI

The course aims to understand neuroscience-inspired AI models. The lecture covers error backpropagation in biological neural networks, temporal credit assignment, learning algorithms, and neuroscience of decision making. learning, and inference. The second part of the lecture
(Recommended topical prerequisites: BCS304 Theoretical Neuroscience)

BCS542 Modern Brain-Computer Interface

The course focuses on modern Brain-Computer Interface (BCI) design and technologies, including basics of EEG, signal processing, ERP, oscillation, machine learning, and BCILAB and the lab streaming software.
(Recommended topical prerequisites: BCS442 Principles of Brain Engineering)

BCS561 Neurological Disorders

The Neurological disorders class is a class that provides a comprehensive overview of the entire field of neurology. It includes physical medicine, cooperative treatment, and emergency neurology related to neurology such as dementia, movement disorders, stroke, sleep disturbance, headache, and epilepsy, and will teach diagnosis and treatment methods for all neurological diseases. The neurological disease class aims to provide useful neurological disease information to all neurocognitive scientists interested in clinical research and researchers involved in the treatment of neurological diseases.
(Recommended topical prerequisites: BCS361 Disorders and Diseases of the Nervous System)

BCS562 Psychiatric Disorders

Psychiatry class provides a truly comprehensive overview of the entire field of psychiatry. It also includes psychosomatic medicine and collaborative care, and emergency psychiatry, and compares Diagnostic and Statistical Manual (DSM-5) and International Classification of Diseases (ICD10) classifications for every psychiatric disorder. Psychiatry is an essential class for brain scientisits in clinical practice and clinical research and for all those involved in the treatment psychiatric disorders.
(Recommended topical prerequisites: BCS361 Disorders and Diseases of the Nervous System)

BCS580 Critical Thinking and Scientific Writing

This class provides training sessions for students to think critically and write logically in order to grow as solid scientists and engineers. We offers a chance to learn the basic principles of critical thinking and study how to write scientific papers by analyzing existing scientific papers. Students will learn how to logically develop texts and effectively describe scientific research results.

BCS601 Attention: neural mechanisms and cognition

Attention is one of the most investigated research area in cognition. This course addresses key research on the attention process in the brain and provides in-depth discussions on issues related to perception, memory retention, and decision making in attention research.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS602 Audition: neural mechanisms and cognition

This course explores the processes of auditory perception in the brain. The hierarchy of auditory processing, cortical network circuits and the internal representation of information are discussed to understand the biological auditory system.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS603 Decision-Making: neural mechanisms and cognition

This course is designed to introduce the academic achievements of investigation for the phenomena that occur in the brain during decision-making based on behavioral and neuroimaging experiments and neural theories. It consists of lectures on decision neuroscience and presentations of classical papers (students). It considers the cognitive processes in which decision is making, and describes the phenomena that occur in brain regions during deciison-making. In particular, the understanding of decision-making obtained from neuroeconomics, behavioral economics, and cognitive psychology is introduced, and decision-making neural processes are described.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS604 Emotion: neural mechanisms and cognition

This course introduces and discusses how emotional processes work in the brain and affect other cognitive processes, based on multidisciplinary aspects such as psychology, neuroscience, psychiatry, biology and behavioral science.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS605 Memory: neural mechanisms and cognition

The memory function is the basis for recognizing objects and social relationships, indicating that it is the basis of the cognitive process. This course introduces theories and neural mechanisms of memory processes and discusses recent issues on memory.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS606 Sensory and Motor Systems

This lecture deals with the origins and history of neurogenetics with the aim of understanding how genetic information controls brain function and development, ultimately affecting brain health and brain disease.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS607 Vision: neural mechanisms and cognition

This course provides fundamental concepts in vision neuroscience, emphasizing on the processes of visual perception. Explores the hierarchy of visual processing, from the retina through cortical networks to the internal representation of visual information, to understand what kinds of strategies the biological visual system uses, from experimental and practical perspectives.
(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS608 Neurons and Glia

This lecture deals with the neurons and glias, the two main cellular components of the brain and their interactions. It aims to understand the structural and functional differences between neurons and the mehcanism underlying their interactions.
(Recommended topical prerequisites: BCS501 Molecular and Cellular Neurobiology)

BCS609 Sleep and Biological Rhythms

This lecture aims to understand sleep and biorhythm at the molecular-cell-neural circuit level. It examines the meaning of circadian and circannual biological rhythms and discusses the effects on brain function and health.

BCS610 Stem Cells, Organoids, Neurotoxicity and Repair

This lecture provides information on the characteristics and utilization of stem cells and organoids, which are key technologies for treating future brain diseases. In-depth discussions will be held on how stem cells and organoids will contribute to the treatment of brain diseases in the future.
(Recommended topical prerequisites: BCS501 Molecular and Cellular Neurobiology)

BCS611 Transcriptomics, Genomics, and Epigenomics

Gene expression is the basis of life and plays an important role in brain functions. This course deals with molecular biological knowledge related to brain cognitive science. We also discuss the latest papers on the relationship between genetics and cognitive impairment.
(Recommended topical prerequisites: BCS501 Molecular and Cellular Neurobiology)

BCS612 Neuroimmunology

This lecture deals with the interaction between the brain and the immune system to provide information on how the brain affects our immune functions and how the immune system controls brain function.

BCS621 Functional MRI Methods

This course aims to understand the principles of functional magnetic resonance imaging (fMRI), a key tool in the field of cognitive neuroscience, and the methods for designing fMRI experiments and analyzing the collected data.

BCS622 Methods in Neuromodulation

This course aims to understand the basic principles of various neuromodulation methods, including optogenetics, bioelectronics and brain–machine interfaces, and to acquire knowledge about how each method is applied to the brain, spinal cord, and peripheral nerves.

BCS623 Neuroethics: neuroscience of morality

The Neuroethics class offers an informed view of how the brain sciences are being used to approach, understand, and reinvigorate traditional philosophical questions, as well as how those questions, with the grounding influence of neuroscience, are being revisited beyond clinical and research domains. It also examines how contemporary neuroscience research might ultimately impact our understanding of relationships, flourishing, and human nature. This class spotlights new technologies and historical articulations of key problems, issues, and concepts to highlight the complex interactions of concepts and ideas within neuroethics.
(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS624 Neuroethology: animal behavior

This class is designed to offer a comprehensive introduction to behavioral biology and explains fundamental principles and illustrates them with specific examples of various animlas. This class shows all aspects of animal behavior into a coherent framework with a perspective of behavior and ecology.

BCS625 Reasoning in the Brain

This course focuses on theories to explain human thinking and reasoning processes and discusses how to understand neural space to reason in relation to language processing.
(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS641 Neuromorphic Engineering

This course introduces biologically inspired neuromorphic engineering mimicking the functional behavior and structure of the neural circuits. Topics include spiking neural networks and temporal neural networks for neuromorphic computing systems with biological plausibility, focusing on brain–like processing and energy efficiency.

BCS642 Neuroprosthetics

This course provides the fundamental knowledge needed to understand how electrodes translate neural activity into signals that are useable by machines and enables readers to master the tools of design thinking and apply them to any neuroprosthetic application.
(Recommended topical prerequisites: BCS542 Modern Brain–Computer Interface)

BCS661 Aging and Neurodegenerative Disorders

Neurodegenerative disorders are associated with a progressive loss of structure and function of neurones that leads to neuronal death. Their aetiology combines ageing, genetic susceptibility, and risk factors including environmental exposure, balanced against protective factors. This class provides with varying combinations of progressive cognitive, emotional, motor, autonomic and peripheral symptoms, and clinical signs in the dieases. We introdces with advanced intervention for neurodegenerative disorders that help patients treat, prevent, or manage a disease and that have a proven clinical benefit. This class provides with methodologies for various methods suffering from dementia, parkinson's disease and other neurodegenerative diseases. This class is intended to provide useful information on Aging and Neurodegenerative Disorders to all neurocognitive scientists interested in clinical research and researchers involved in the treatment of neurodegenerative Disorders.

BCS662 Developmental Disorders

Over the last four decades, breakthroughs in genetic knowledge, together with the emergence of disciplines devoted to the scientific study of developmental disorders have resulted in much greater awareness of the many different behavioural and genetic phenotypes involved. It is now evident that not only do different disorders have different causes and different manifestations, but different neurological and biochemical bases, different responses to intervention, and different life courses. Reflecting the enormous changes that have taken place in our knowledge and understanding of developmental disorders, this class brings this vast and complex field together. We provides lectures on how current research across a range of different disciplines can inform clinical practice and help to improve the lives of individuals and their families.

BCS663 Neural and Cognitive Rehabilitation

Neurological and Cognitive Rehabilitation class is a class that provides a comprehensive overview of various methodologies for rehabilitating patients suffering from mental and neurological diseases. It introduces various rehabilitation methods for neurological diseases such as dementia, movement disorders, and stroke, as well as mental disorders such as attention-deficit hyperactivity disorder (ADHD) and autism, and teaches treatment principles and fundamental theories. This class is intended to provide useful information on rehabilitation medicine to all neurocognitive scientists interested in clinical research and researchers involved in the treatment of mental and neurological diseases.

BCS701 Statistical Learning Theory and Applications

Statistical learning theory is a framework for machine learning in the field of statistical and functional analysis, mainly dealing with the problem of statistical inference to find predictive functions based on data. This course aims to introduce the fundamental principles of statistical learning and provide with exercise in applying them to real-world problems. It firstly introduces statistical learning theory and its association with neuroscience, and describes how it has successfully applied in fields such as computer vision, speech recognition, and bioinformatics.

BCS702 Structural and Functional Connectomics

This course introduces quantitative approaches to understanding functional circuits in the brain that perform various tasks. Topics include mathematical description of circuits and circuit motifs of the local and global neuronal connectome in the brain.

BCS721 Art, Aesthetics, and the Brain

Humans have engaged in artistic and aesthetic activities since the appearance of our species. Our ancestors have decorated their bodies, tools, and utensils for over 100,000 years. This class introduces the expression of meaning using color, line, sound, rhythm, or movement, among other means, and how human constitutes a fundamental aspect of our species' biological and cultural heritage. This class also show that art and aesthetics contribute to our species identity and distinguish it from its living and extinct relatives.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS722 Biological Evolution of Homo Sapiens

This class presents a theory on the cognitive evolution of our species. It proposes that the success of modern Homo sapiens was enabled by an additive genetic mutation or epigenetic event that affected the neural organization of the brain. We introduce the notions of natural selection which apply to humans and their biological and cultural evolution. We introduce the science of paleoanthropology which explains human evolution through the study of intermediate fossil forms. In addition, we show that geneticists have been able to retrace, through the study of mitochondrial DNA and Y-chromosome DNA, the origin and migrations of prehistoric humans. This class show that the understanding of human cultural evolution has greatly benefited from the application of evolutionary thinking.

(Recommended topical prerequisites: BCS521 Evolutionary Psychology)

BCS723 Brain-Body Interactions and Embodied Cognition

While “Embodied Cognitive Science” has significantly developed over the last 20 years or so, it remains unclear what it actually implies. This class emphasize that embodied cognitive science particularly implies that abstract thought, such as our ability to understand and produce a large variety of metaphors, must develop from our gathered sensorimotor experiences about our world. While we experience our body and the environment, and actively explore it, our mind produces particular neural structures to improve these bodily and environmental interactions. This class show that our minds manage to detach thought from the here and now, opening the possibility to think about social interactions with the environment including other humans, and about explanations for unexplainable observations.

(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS724 Comparative and Evolutionary Neuroscience

This class provides an up to date, comprehensive overview of the field of comparative neuroscience, integrating both evolutionary and developmental studies of brain and behavior for

animals. This class introduces cognitive and associative capacities of animals, the development of the central nervous system and behavior, and the fossil record of animals including human ancestors. This class includes many examples drawn from the study of human behavior, highlighting general and basic principles that apply broadly to the animal kingdom. In addition, genetics, epigenetics, neurobiological, and cognitive advances made in recent years into this evolutionary-developmental framework are also included.

BCS725 Consumer Behavior and Neuromarketing

This class 'Consumer Behavior and Insights' presents a new approach to teaching consumer behavior. We moves beyond traditional psychological learning to acknowledge more holistic perspectives of consumer behavior, incorporating new areas of research, such as neuromarketing and artificial intelligence. This class includes the latest behavioral, psychological, and sociological approaches to elucidate important concepts and models of consumer decision-making. Importantly, we show important research and consumer insights to bring these concepts and models to life.

BCS726 Infant and Early Childhood Cognition

This course focuses on the development of various cognitive processes in early childhood, including perception, knowledge, concepts, reasoning, memory and language. Additionally, we also discuss the origins of various human cognitive functions.

BCS727 Religion in the Brain

This lecture deals with a brain-scientific approach to religion, an essential human belief. The purpose is to enhance the understanding of humans by scientifically examining phenomena related to why the brain has faith.
(Recommended topical prerequisites: BCS523 Principles of Cognitive Neuroscience)

BCS741 Materials Physics of Neural Interfaces

This course focuses on the materials physics for multifunctional neural interfaces spanning individual neurons to neural networks, neural tissues, and complete neural systems.

BCS742 Neurorobotics

This course introduces approaches and design principles for developing intelligent autonomous systems in neuroscience. Topics include cognitive neurorobots, neurorobots for navigation, developmental robotics, and social robots.

BCS743 Principles and Applications of Genetic Engineering for Neuroscience

This course focuses on development and invention of technologies for engineering biological systems at the genomic level, and applications of engineering systems for neuroscience.

BCS761 Advanced Intervention for Neuropsychiatric Disorders

Advanced intervention for neuropsychiatric disorders are evidence-based therapeutic interventions to prevent, manage, or treat a medical disorder or disease. In other words, Advanced intervention for neuropsychiatric disorders is patient-facing online and offline applications that help patients treat, prevent, or manage a disease and that have a proven clinical benefit. This class provides with methodologies for various Therapeutics suffering from mental and neurological diseases. It introduces various Therapeutics methods for mental diseases such as dementia, attention-deficit hyperactivity disorder (ADHD) and autism, and teaches treatment principles and fundamental theories. This class is intended to provide useful information on Advanced intervention for neuropsychiatric disorders to all neurocognitive scientists interested in clinical research and researchers involved in the treatment of mental diseases with brain technology.
(Recommended topical prerequisites: BCS561 Neurological Disorders, BCS562 Psychiatric Disorders)

BCS762 Digital Therapeutics

Digital Therapeutics (DTx) are evidence-based therapeutic interventions driven by software to prevent, manage, or treat a medical disorder or disease. In other words, DTx are patient-facing software applications that help patients treat, prevent, or manage a disease and that have a proven clinical benefit. This class provides with methodologies for Digital Therapeutics suffering from mental and neurological diseases. It introduces various Digital Therapeutics methods for mental diseases such as dementia, attention-deficit hyperactivity disorder (ADHD) and autism, and teaches treatment principles and fundamental theories. This class is intended to provide useful information on Digital Therapeutics to all neurocognitive scientists interested in clinical research and researchers involved in the treatment of mental diseases with digital technology.

BCS881 Advanced Topics in Brain and Cognitive Sciences

This lecture deals with specific topics that were not covered in the department's existing courses among the broad topics of brain and cognitive science for the graduate students. Classes consist of lectures by professors and presentations and discussions by students. If it is conducted more than 3 times and is operated stably, it can be considered as a formal course.

BCS882 Current Issues in Brain and Cognitive Sciences

This lecture deals with recent hottest topics that were not covered in the department's existing courses among the broad topics of brain and cognitive science for graduate students. Classes consist of lectures by professors and presentations and discussions by students. If it is conducted more than 3 times and is operated stably, it can be considered as a formal course.

BCS960 (MS)Thesis Research

A student selects an M.S. thesis topic with an advisor, and carries on independent research. The student is required to submit an M.S. thesis as an end product.

BCS966 Seminar(MS): departmental colloquium

We invite promient researchers who have made important research achievements in the fields of brain and cognitive science, such as neurobiology, cognitive science, theoretical neuroscience, brain engineering, and brain medicine, to introduce the research results and share the research process. It will be a valuable time for both professors and students to understand the latest research results and learn the research methods of researchers.

BCS980 (Ph.D)Dissertation Research

A student selects an M.S. thesis topic with an advisor, and carries on independent research. The student is required to submit an Ph.D. Dessertation research as an end product.

BCS986 Seminar(Ph.D): departmental colloquium

We invite promient researchers who have made important research achievements in the fields of brain and cognitive science, such as neurobiology, cognitive science, theoretical neuroscience, brain engineering, and brain medicine, to introduce the research results and share the research process. It will be a valuable time for both professors and students to understand the latest research results and learn the research methods of researchers.

BCS998 Practical Experience in Brain and Cognitive Sciences(MS)

This class is a kind of graduate internship which provides an opportunity for graduate students to gain various experiences such as research and start-up at companies, research institutes, and other universities. This class encourage global collaboration with excellent institutions.

BCS999 Practical Experience in Brain and Cognitive Sciences(Ph.D)

This class is a kind of graduate internship which provides an opportunity for graduate students to gain various experiences such as research and start-up at companies, research institutes, and other universities. This class encourage global collaboration with excellent institutions.