

# Department of Psychology Courses

## About Course Numbers:

Each Carnegie Mellon course number begins with a two-digit prefix that designates the department offering the course (i.e., 76-xxx courses are offered by the Department of English). Although each department maintains its own course numbering practices, typically, the first digit after the prefix indicates the class level: xx-1xx courses are freshmen-level, xx-2xx courses are sophomore level, etc. Depending on the department, xx-6xx courses may be either undergraduate senior-level or graduate-level, and xx-7xx courses and higher are graduate-level. Consult the Schedule of Classes (<https://enr-apps.as.cmu.edu/open/SOC/SOCServlet/>) each semester for course offerings and for any necessary pre-requisites or co-requisites.

## 85-102 Introduction to Psychology

Fall and Summer: 9 units

The world is a crazy, confusing place. Much of what we encounter is ambiguous, dynamic, and misleading. Somehow, we have to make sense of it. This class is about how we do that. The course provides an overview of the major areas of scientific psychology, exploring the models of our mind, brain, and behavior that explain wide areas of human (and non-human) functioning. Topics range from neuroscience and the biological basis of behavior, to memory and thought, to social interaction and psychological development over the lifespan, to abnormal psychology, psychopathology, and treatment. Tuesday and Thursday lectures provide a broad survey of topics and findings in psychology. In recitation sections students get hands on experiencing thinking about psychological science by designing and running psychological studies and discussing the real world implications of the concepts they have investigated. While all sections will be completing the same activities, some of the sections are themed. Themed sections will frame the discussion in the context of the theme, thus allowing students in those sections to better appreciate the links between the work being done in the class and the theme of that section. However, the core material will be the same and all sections will prepare students equally well for exams and upper division courses. General (unthemed) sections will sample across themes and topics, rather than being focused on a single theme. At the end of this course, students will not only be more knowledgeable about psychology, but be able to apply their knowledge about psychology to be better thinkers, learners, and consumers of information in general. Themed sections: Design - Register through Design Medicine, health, and Biosciences - Section I Decision Science, business, and economics - Section A

## 85-104 Psychopathology

Fall: 9 units

This course provides an introduction to the science and practice of psychopathology. Students will examine definitions of psychopathology in a historical and contemporary context, explore issues relevant to diagnosis and patient care, and be introduced to various diagnostic categories for psychological disorders. Students will also learn about potential determinants of and treatments for psychological disorders in the context of major theories and empirical findings in the field. Emphasis will be placed on three major paradigms in psychopathology: genetics, neuroscience, and cognitive behavioral. An assigned memoir, case studies, and short video clips will be used to illustrate the human side of mental illness.

## 85-105 Hack Your Life

Spring: 9 units

Hack your life! College offers a new opportunity to hack your life to explore who you are, how you learn, and how you can take better care of yourself. This course will give you the opportunity to fully explore the CMU student experience, the science of learning, and to explore issues central to students (e.g., resilience, social connections, mental health, sleep). Much of this course will focus on providing discussion, strategies, and practices around how you can live a better life, and nurture your happiness and health.

## 85-106 Animal Minds

Intermittent: 9 units

With intricate cultures, impressive technology, and layered social lives, humans seem to stand apart from their animal kin. However, humans and non-human animals share many aspects of their mental lives, and, upon closer inspection, some animals even reveal cognitive abilities far beyond the capacities of humans. Through comparing and contrasting human and non-human cognition, we can learn about human psychological uniqueness and its evolutionary origins, and fundamental properties of cognitive processes in general

## 85-107 The Psychology of Video Games

Intermittent: 9 units

This course will explore how the features of video game design and use relate to characteristics of human psychology. We will discuss design and use issues such as microtransactions, online gaming communities, and reward/scoring, and try to understand how these features are (or are not!) well suited to the human mind, with a particular focus on learning, memory, attention, and perception. Student presence will sometimes be required but many course sessions will be asynchronous.

## 85-120 Demystifying Freud and the Discipline of Psychology

Intermittent: 3 units

Regardless of discipline, an understanding of human thought and behavior is essential in navigating one's environment and work. Psychology, the science that can guide this understanding, is often misunderstood by the general public. Throughout the world, when psychology is mentioned, the name that often comes to mind is Sigmund Freud. Many of the misconceptions regarding psychology started with misinterpretations of Freud's work and concepts. Using Freud's most well-known concepts, this course will introduce students to what psychology is, and what it isn't - in hopes of illustrating what use psychological principles can be in a plethora of academic disciplines. In particular, students will learn how to apply these principles to modern day research settings with a specific focus on health and well-being research. Students will not only gain insight into their own academic and career paths, but into their own personality and health as well. Course work will consist of class attendance, weekly course readings and online discussions, one exam, and a final paper.

## 85-150 Cognitive Science at CMU and beyond

All Semesters: 9 units

This course provides an introduction to the broad field of Cognitive Science, with a particular emphasis on psychological methods and the role of memory in cognition. In addition to giving students a sense of some of the applied areas that use Cognitive Science research, this course gives a sampling of research questions and phenomena to help decide whether this might be a good choice for a major or minor while studying at Carnegie Mellon. Topics that will be discussed include attention, perception, cognitive illusions, memory, language acquisition and skill acquisition. There is an emphasis of the applications of cognitive science to real life situations, for example, best practices for learning in an academic setting. The course will also provide the opportunity to learn about the scientific method and collect data by running an experiment (online, on a computer). The class meets twice per week for 1.5 hours for each class. The plan is to focus more on lecture and discussion of readings on Tuesday and focus more on teaching new skills such as experimental design, data analysis and running experiments on Thursday.

## 85-198 Research Training: Psychology

Fall and Spring: 9 units

See course url and click on (forms and guides informational handout page) then click on current freshman-sophomore research training courses for listing of research training course descriptions.

Course Website: <https://www.cmu.edu/dietrich/students/undergraduate/programs/research-training-program.html>

**85-211 Cognitive Psychology**

Fall and Spring: 9 units

This course focuses on the fascinating way that the brain processes the world and allows us to interact with it. Aside from covering the major topics in cognitive psychology (language, memory, visual processing, attention and cognitive control), it includes an introduction to some of the most recent approaches to studying human cognition. The course is set up to highlight the connection between cognitive studies and skills in various majors such as computer science, math, statistics, and medicine. It is also structured to foster the necessary skills for the critical analysis of complex problems.

**85-213 Human Information Processing and Artificial Intelligence**

Fall: 9 units

This course will review the information-processing challenges that humans face. We will discuss how these challenges are dealt with in the domains of attention, perception, memory, problem solving, reasoning, decision-making, and language. We will compare and contrast how these challenges are dealt with by humans and artificial intelligence applications. The course will include a number of programming projects that try to solve specific information-processing demands that occur in particular tasks and simulate human information processing. Student must have taken or currently be taking 15-122 or 15-150. If you will be taking 15-122 or 15-150 as a co req for this course, please contact Emilie O'Leary emilier@andrew.cmu.edu to be registered.

Prerequisites: 15-150 or 15-122

**85-219 Foundations of Brain and Behavior**

Fall: 9 units

This course provides a general introduction to the neural foundations of behavior. Topics will cover cognitive, perceptual, motor, social, and affective aspects of behavior. Each topic will be addressed at multiple scales, from single neurons and their interactions, to brain systems, to computational principles, and to real-world behaviors. While the focus will be on foundational principles and mechanisms (including some pretty cool case studies, illusions, anecdotes, etc.), there will also be some effort given to integrating current advances in computational cognitive neuroscience, including both the applications of modern AI to understanding biological systems and how principles drawn from biological systems might inform or improve artificial systems. Students are expected to regularly attend and participate in class.

**85-221 Principles of Child Development**

Fall and Spring: 9 units

This course is about normal development from conception through adolescence. Topics include physical, perceptual, cognitive, emotional and social development. Students will learn facts about children at various points in development, theories about how development works, and research methods for studying development in infants and children. Students will be encouraged to relate the facts, theories and methods of developmental psychology to everyday problems, social issues and real world concerns.

**85-232 Thinking in Person vs. Thinking Online**

Fall: 9 units

Being online changes how we think. Different media lead us to ask different questions, remember (or forget) different information, attend to different details, and interact with other people in different ways. These types of thinking aren't inherently better or worse, but they may be better or worse for facilitating specific goals. Too often, we use a particular medium/technology without considering how it will influence our thinking. This can lead us to be less efficient or less effective at a task than we otherwise might be, or can qualitatively change the nature of our outcomes. In this class, we will explore how the media we use affects the character of our thinking, so as to enable students to make mindful and deliberate choices about how to interact with media in ways that support the type of thinking desired and appropriate for their goals. Moreover, we will examine how to optimize media for specific goals in important applied domains, such as education, medicine, policy, child-rearing, and dating.

**85-241 Social Psychology**

Fall and Spring: 9 units

The focus of this course will be on how peoples behavior, feelings and thoughts are influenced or determined by their social environment. The course will begin with lectures and readings on how social psychologists go about studying social behavior. Next, various topics on which social psychologists have done research will be covered. These topics will include: person perception, prejudice and discrimination, the nature of attitudes and how attitudes are formed and changed, interpersonal attraction, conformity, compliance, altruism, aggression, group behavior, and applications of psychology to problems in health care, law, politics, and the environment. Through readings and lectures on these topics, students will also be exposed to social psychological theories.

**85-250 Hack Your Life: The Science and Practices of Student Health and Well-Being**

All Semesters: 9 units

College offers a new opportunity to hack your life to explore who you are, how you learn, and how you can take better care of yourself. This course will give you the opportunity to fully explore the CMU student experience, the science of learning, and to explore issues central to students (e.g., resilience, social connections, mental health, sleep). Much of this course will focus on providing discussion, strategies, and practices around how you can live a better life, and nurture your happiness and health.

**85-251 Personality**

Intermittent: 9 units

The primary purpose of personality psychology is to understand human uniqueness and #8212;how and why it is that one person differs from others, in terms of the ways that they thinks, feels, and acts. Students in the course will be exposed to several broad theoretical perspectives, each of which attempts to capture and understand the origins and consequences of individual distinctiveness from a slightly different vantage point. Included among these approaches are the dispositional or trait, psychoanalytic, learning, humanistic, and cognitive self regulation perspectives. This is a survey course and is intended to provide students with a broad background of theory and research in the area. Class meetings consist primarily of lecture, but there is some discussion too. Students will be given the opportunity to assess their own personalities during the course. A consistent theme throughout the course is the relationships between aspects of one's personality and physical health.

**85-252 Intro to Health Psychology: SES and Health Inequalities**

All Semesters: 3 units

Health Disparities exist in many countries around the world. For years researchers have sought to determine the root cause of these disparities and to explain why some people live significantly longer, healthier lives than others. Both mortality and morbidity rates can be related to ones' place in society and one's interactions with others. This course is designed to critically examine the social factors research has found to impact individual and population health experiences. We will focus specifically on those factors that comprise one's socioeconomic status. Students in the course will learn how money and access to health services are not the only factors that matters when it comes to one's health.

**85-258 Intro to Health Psychology: Stigma and Its Consequences**

All Semesters: 3 units

This course will introduce students to theoretical and empirical psychological research on prejudice and social stigma. The topics covered will include examinations of why individuals stigmatize: exploring cognitive, evolutionary, self, and system justification explanations. The course will examine the consequences of stigmatization for low-status groups (e.g., stereotype threat, dis-identification, internalization, health outcomes). We will explore the role of stigma in intergroup interactions and variation in the experience of stigma. Specific course topics will include the meaning of stigma, why people stigmatize, the physiological, cognitive-affective and social behavioral processes linking stigma and health outcomes, and moderators of stigma.

**85-261 Psychopathology**

Intermittent: 9 units

The study of psychopathology is not an exact science; nor are there many clear-cut parameters with which to differentiate "normal" and "abnormal" behavior. This course will focus on learning about and understanding the range of behaviors which fall within the province of "abnormal" psychology. Its approach will be descriptive, empirical, theoretical, and conceptual. Students will examine definitions of "abnormality" in a historical and contemporary context, explore issues relevant to diagnosis and patient care, be introduced to various psychological diagnostic categories, and develop an appreciation of the range of empirically-supported treatments for these disorders.

**85-265 Introduction to Research Methods**

All Semesters: 9 units  
No course description provided.

**85-271 Animal Minds**

All Semesters: 9 units  
With intricate cultures, impressive technology, and layered social lives, humans seem to stand apart from their animal kin. However, humans and non-human animals share many aspects of their mental lives, and, upon closer inspection, some animals even reveal cognitive abilities far beyond the capacities of humans. Through comparing and contrasting human and non-human cognition, we can learn about human psychological uniqueness and its evolutionary origins, and fundamental properties of cognitive processes in general

**85-281 Introduction to Clinical Psychology**

Spring: 9 units  
This course is designed to introduce students to a wide variety of concepts in the area of clinical psychology. We will explore clinical psychology in an historical perspective, ethics related to the practice of psychology, and various theories of psychotherapy (Including psychoanalytic, psychodynamic, existential, and cognitive behavioral). Also, we will look at group theories underlying group therapy and family/systems therapy.  
Prerequisites: 85-251 or 85-261

**85-294 Teaching Assistantship**

Intermittent  
This course is designed to provide students with an apprenticeship in the practice of teaching through one-on-one interaction with a faculty member in the design, administration, and teaching of a course. The student should have previous coursework in the topic domain of the course to ensure that they have the basic skills and background necessary to contribute to the course. The Teaching Assistantship will be supervised by a faculty member, and should result in a concrete, measurable contribution to a course (such as the design of assignments or exams) and/or a reflection on the practical and pedagogical considerations of course design (such as a paper). It is the student's responsibility to make independent arrangement for independent course study courses with individual faculty members. This should be done the semester before a student wishes to register for one of these courses. The course may be taken for any number of units up to 9, depending on the amount of work done.

Course Website: <https://tinyurl.com/2encx2n3> (<https://tinyurl.com/2encx2n3/>)

**85-300 Introduction to Research Methods**

All Semesters: 9 units  
The overall goal of this course is to help you transform from being consumers of research knowledge to being evaluators and producers of it. This course provides (a) hands-on exploration of fundamental concepts in research design, statistical analysis, scientific writing, and ethics; (b) skills necessary for designing, conducting, analyzing, and disseminating an observational study; and (c) skills for critically evaluating psychological research and mainstream media reports of it.  
Prerequisites: (85-104 or 85-219 or 85-251 or 85-221 or 85-241 or 85-102 or 85-213 or 85-211) and 36-200

**85-309 Statistical Concepts and Methods for Behavioral and Social Science**

Spring: 9 units  
Research in the Social Sciences is a project of understanding the ways in which people are similar while grappling with the ways in which they are different. Statistical methods are a powerful tool for managing the tension between the two. This course introduces the statistical methods most commonly used in the social sciences, as well as their implementation in the R programming language. Topics involve exploratory data analysis, sampling and randomization, hypothesis testing, and power analysis.  
Prerequisites: 36-201 or 36-200

**85-310 Research Methods in Cognitive Psychology**

Fall and Spring: 9 units  
This is a course in which students develop the research skills associated with cognitive psychology and cognitive science. Students learn how to design and conduct experiments, and analyze and interpret the data they collect. The course covers a variety of experimental designs, e.g., factorial, Latin Squares. Analyses of response times, qualitative data, and signal detection are also covered. Cognitive modeling will also be discussed. Topics include mental imagery, memory, and perception. The class format consists of lectures, discussions and student presentations.  
Prerequisites: (85-211 and 36-309) or (85-213 and 36-309) or (85-211 and 85-309) or (85-309 and 85-213)

**85-311 Research Methods: Meta-Analysis**

Intermittent: 9 units  
The scientific process is inherently cumulative: Scientific understanding moves forward by building on the theories, methods, and findings of individual research. The broad aim of this course is to teach you a set of practical tools called meta-analysis for synthesizing existing research.  
Prerequisites: 85-320 or 85-330 or 85-314 or 85-340 or 85-310 or 85-300

**85-314 Cognitive Neuroscience Research Methods**

Intermittent: 9 units  
This is a hands-on laboratory course designed to foster basic skills in the empirical approaches used in cognitive neuroscience research. Students will learn how to evaluate which cognitive neuroscience method is best suited to a research question, basic experimental design and analysis, and how to formally present empirical results. The course will focus on functional MRI, but will also cover structural MRI (diffusion imaging) and EEG, and survey various other methods. Students will work with actual datasets using the current software used by cognitive neuroscience researchers.  
Prerequisites: (36-309 or 85-309) and (85-219 or 85-211)

**85-316 Research Methods in Health Psychology**

Spring: 9 units  
TBA

**85-320 Research Methods in Developmental Psychology**

Fall and Spring: 9 units  
This is a laboratory course, in which the student will have direct experience working with children, as well as writing research reports and designing and critiquing research in child development. The purpose of the course is to develop research expertise that will assist the student both in carrying out research and in evaluating the research of others. Special emphasis will be given to the unique methodological problems associated with the study of development. Students must be sure they are also available to attend the Children's School during specific blocks in addition to the class meeting times. Testing times will be Monday- Thursday with 3 year old testing times being from 8:45-9:30am, 10:20-12:15pm. 4 year old testing times being from 8:30-9:15am, 10:05-12:20pm, 1:10-2:20pm. Ks testing times being 8:45-9:45am, 10:15-11:15am, 1:15-2:25pm, student need to be available for one time slot from each age.  
Prerequisites: (85-309 and 85-221) or (36-309 and 85-221)

**85-330 Analytic Research Methods**

Intermittent: 9 units

This class will teach students how to apply six major non-experimental research methods used in analytic behavioral analysis. Protocol Analysis. This method is used to study patterns and changes in problem-solving and their matches to theoretical models, including computational models. Corpus Analysis. This method is used to isolate patterns of behavioral and communication usage and change, as revealed through the study of the world-wide web and large computerized databases such as CHILDES, TalkBank, or the British National Corpus. Tools here include text searches and data-mining. Conversation Analysis. This is a microanalytic method used to examine sequencing, repair, and orientation in closely transcribed recordings of spoken interactions, as made available through systems such as the CABank database, as well as recorded programs on YouTube and elsewhere. Coding Systems. This approach seeks to capture interactional and behavioral structures in writing, teaching, interview, and other interactions. Here, there will be a special emphasis on the coding of instructional interactions. Gesture Analysis. This microanalytic method seeks to track patterns in gestural and nonverbal communication, often in association with spoken messages. Profile Analysis. This approach studies differences across learners at various ages and ability levels and group differences involving aphasia, autism, stuttering, dementia, and other individual differences. Students will work with data already available from previous studies, and will also learn to collect their own new datasets. Although the data being examined have been generated through naturalistic processes, they can be analyzed quantitatively using time-series analyses, non-parametric statistics, error matrices, and neural network simulations. In these various analyses, we will also consider how behavioral patterns are shape

Prerequisites: 36-200 or 36-201

**85-340 Research Methods in Social Psychology**

Fall and Spring: 9 units

This course is designed to provide students with the necessary knowledge to evaluate research, make transitions between theory and the operations that test the theory, and to design and carry out original research. Topics will include the nature of proof and causal inference, manipulation of independent variables, measurement of dependent variables, questionnaire design, experimental, and quasi-experimental, design and ethical issues involved in doing research. Survey, observational and experimental techniques as applied in both field and laboratory settings will be covered. Students will be expected to criticize completed research. They are also expected to design measures and complete their own original studies. During the course of the semester students will also be expected to design and carry out an original research project as well.

Prerequisites: (85-251 and 36-309) or (36-309 and 85-241) or (85-309 and 85-241) or (85-309 and 85-241)

**85-343 Children, Race, and Racism**

Intermittent: 9 units

Millions of children grow up in racialized societies that are organized along racial lines historically, politically, and economically. How do children growing up in racialized societies come to understand race? How do children learn racism? How do children develop resilience in the face of racism? These are some of the questions we will address in this course through a combination of reading primary empirical and theoretical articles in psychology and class discussion.

Prerequisites: 85-221 or 85-104 or 85-251 or 85-241 or 85-102 or 85-219 or 85-211

**85-345 Meaning in Mind and Brain**

Intermittent: 9 units

What does it mean to say that an object, word, event or sentence means something? What is the nature of semantic representations that are activated in the brain during comprehension, and how are they related to perceptual, linguistic, mnemonic and motor representations? How do these representations emerge over the course of development, and how can they be selectively impaired by brain damage? This course examines these and related questions by drawing on findings from a broad range of methodologies, including developmental studies of young children, behavioral studies of adults, neuropsychological studies of brain-damaged patients, neurophysiology and functional brain imaging, and computational modeling. The course will take a seminar format in which students read, present and discuss the current literature.

Prerequisites: 85-213 or 85-211 or 85-219

**85-347 Stress and Health Across the Lifecourse**

Intermittent: 9 units

This seminar is designed to delve deeper into the topic of stress and health with a life course perspective. The aims of this course is to help students develop the conceptual and methodological skills necessary for interpreting empirical studies (as well as claims in pop culture) in this area of research and to understand the critical roles of time and timing. To facilitate these goals, the course will combine brief lectures, discussion of readings, oral presentations, and writing.

**85-350 Psychology of Prejudice**

Spring: 9 units

This course is devoted to the study of both traditional and more modern forms of prejudice and discrimination and the psychological processes that can arise from categorizations and stereotyping. The class provides an overview of the cognitive and emotional underpinnings of prejudice and discrimination as it pertains to many forms of inequality. Its goal is to examine social differences and social inequality in many areas of society. The psychological theories underlying these behaviors will be examined as well as their impact on the lives of stigmatized individuals. In addition to the traditional forms of prejudice based on such things as race, gender and age, other inequalities that result from less traditional groupings such as social class, appearance, and disability will be explored. Research on issues of social identity, intergroup relations and the reduction of prejudice will be examined through readings and class activities.

Prerequisite: 85-241

**85-351 What is Attention?**

Intermittent: 9 units

For over a century, scientists have claimed that no one knows what attention is yet the past half-century has seen over 40 thousand publications with "attention" in the title. What gives? The primary goals of this course are first to show that we know what attention is and second, to demonstrate how to construct an important type of explanation in cognitive science. We investigate classics in the field and engage cutting edge research, in psychology, neuroscience, and even philosophy. One project will be cleaning house (theory and concepts). At the same time, in identifying the functional nature of attention, we unify different levels of analysis to construct a comprehensive account of what attention is, linking behavior, algorithms and neuroscience. We use this account to tackle various issues: different targets and forms of attention, attention and memory, the difference between attention and priming, attention's relation to behavior, attention and consciousness, executive control, attention's dependence on reward and learning, the developmental biology of attention, disorders of attention, attention and expertise, attention and implicit bias among other topics. Attention forms the foundation of our understanding of many other areas (arguably, it forms the foundation of life). The course will be based on drafts of the forthcoming second edition of the instructor's book, Attention (Routledge, 2014). We will also, hopefully, have guest lecturers from outside of CMU.

Prerequisites: 85-211 or 85-219

**85-352 Evolutionary Psychology**

Intermittent: 9 units

This course will cover both the fundamentals of evolutionary psychology, including the theories of natural and sexual selection, with the overarching aim of providing an overview of the field at an advanced level. We will examine the relevance of evolutionary thinking to a range of psychological phenomena including problems of survival, long-term mating strategies, short-term sexual strategies, parenting, kinship, cooperative alliances, aggression and warfare, conflict between the sexes, and prestige, status, and social dominance. We will also examine evolutionary approaches to sensation and perception, development, consciousness, cognition, language, and abnormal behavior. Juniors and Seniors only or permission of instructor. Pre req: 85-102, 85-211, 85-221, 85-241 or 85-251

Prerequisites: 85-102 or 85-211 or 85-251 or 85-241 or 85-221

**85-353 Mindfulness: Science and Practice**

Intermittent: 9 units

This course will focus on blending first-person experience with mindfulness practices (including mindfulness meditation) and learning about the scientific research on mindfulness. Students will engage in guided mindfulness exercises, develop a daily mindfulness practice, and try out different mindfulness training traditions. In addition, much of this course will be focused on applying a critical eye to the theory, measures, mechanisms, and effects of mindfulness (and mindfulness training interventions) across multiple domains cognition, social processes, behavior, biological mechanisms, and health. As such, this will be a small seminar course focused developing first-person experiences of mindfulness and on discussing the debates and opportunities related to the emerging science of mindfulness.

Prerequisites: 85-340 or 85-310 or 85-320 or 85-314

**85-354 Infant Language Development**

Intermittent: 9 units

While adults struggle to learn languages, almost all infants acquire language with seemingly little effort. This course examines infants' learning abilities and language milestones with a focus on several different theoretical accounts of language development, and the way empirical data can be used to assess those theories. The course is reading intensive, and evaluation will be based on both written assignments and oral participation. Prerequisites: 85-211 or 85-221

**85-356 Expertise: The cognitive (neuro)science of mastering almost any skill**

Intermittent: 9 units

Though some of us struggle to hold a phone number in memory long enough to dial, Lu Chao recited 67,890 digits of pi from memory in 2005. With effort and effective strategies, human perception and cognition can reach great heights. But, even without much intentional practice, most people effortlessly recognize lyrics from hundreds of songs and faces of thousands of people. How does the human brain develop expertise across domains as diverse as music perception and performance, memory, sports, face recognition, and skills like chess? How do experts 'hack their brain' to achieve unusual levels of performance? Is talent made, or is it inborn? Can we capitalize on cognitive science and neuroscience to become better at math, wine tasting, medical diagnosis, or computer programming? In this course, we will work together to answer these questions while learning how to critically evaluate, synthesize, and communicate peer-reviewed research.

Prerequisites: 85-211 or 85-219

**85-357 Navigating Race and Identity in America: The Role of Psychology in Racial Intera**

Intermittent: 9 units

How have social institutions and historical factors led to the belief systems and stereotypes that shape how race is experienced in American society, and how do these belief systems affect the way individuals within racial groups come to view and define themselves? This course will serve as an introduction to how people's psychology how they think, feel, and act shapes their experience of race and identity in America. After a brief discussion about the structural and systemic origins of the racial status quo, we will examine the way that individuals navigate the social and racial landscape of modern-day America. Complementing courses that take sociological approaches to race in America, this course will focus on how individuals' perceptions and thoughts about the world affect how they interpret and respond to social situations. For example, the course will address: how stereotypes about one's race or identity can cause individuals to feel threatened, and can undermine health, feelings of belonging, and academic performance how an individual's concerns about the thoughts and beliefs of others can radically affect identity formation, particularly during adolescence how individuals have to navigate multiple cultural identities, especially as minority group members contending with mainstream ideas that differ from their own how majority group members (e.g., Whites) view their role in racial systems, and how they deal with concerns about being or appearing prejudiced how interventions can use social psychological concepts to mitigate negative outcomes of racial inequality We will then use our understanding of these concepts to examine and consider different racial situations throughout American society and to understand how individuals navigate and experience race and identity. Throughout the course, we will watch films, read literature, and analyze music and art that reflect the experience of race and identity.

**85-358 Pro-Social Behavior**

Fall: 9 units

This course is an advanced seminar that focuses on social psychological research involving the examination of pro-social behavior. A heavy emphasis will be placed on classic research on helping (which investigates how, when, and why we help strangers), as well as the wide body of literature on social support (which investigates how we help, and seek help from, those who are closer to us). Research on both help-seeking and help-provision will be covered, as well as the implications of this type of pro-social behavior for relationships and health. The course also will cover research on other types of pro-social behavior such as empathy, altruism, forgiveness, and cooperation. This is an advanced seminar in which you will be expected to read original research articles and chapters on assigned topics and come to class prepared to discuss the material. Readings will consist of theoretical and empirical articles from psychology journals and related sources. Additional course requirements will involve short, weekly writing assignments, student presentations of research articles, and a written research proposal. Over the course of the semester, students will design and carry out a small-scale, original investigation on a topic of interest.

Prerequisites: 85-330 or 85-340 or 85-314 or 85-320 or 85-310 or 85-311

**85-359 Introduction to Music Cognition Research**

Intermittent: 9 units

This course explores the roles of cognitive processes in the experience of music with a focus on carrying out a collaborative laboratory project in order to understand first-hand the challenges of the experimental study of music. In readings, lectures, discussions, and demonstrations we will become acquainted with the relevant psychological theories of perception, memory and learning, and review and critically analyze selected experimental findings on the psychology of music. We will examine the use of psychological principles (e.g. Gestalt laws of perception, limitations on working memory, categorical perception, chunking, schemas, modularity) to explain musical phenomena. The emphasis will be on applying an experimental approach to music perception and cognition, but we will also consider ongoing debates about larger issues (such as music's adaptive value to the human species, and the determinants of musical taste). Prerequisite: either Harmony 1 or Cognitive Psychology or introduction to psychology or an intro level statistics or by instructor permission. Prerequisites: (36-200 and 85-102) or (36-200 and 85-211)

**85-360 Origins of Intelligence**

All Semesters: 9 units

The nature and origins of human intelligence is a much-debated topic. Questions about the evolution and development of intelligence in humans, how intelligence compares among animals, the basis of intelligence in the brain, how to create intelligence in machines, the role of genes and experience, and individual variability in intelligence are all areas of vigorous scientific inquiry. Popular "folk" views of intelligence (that may be misguided or incorrect) have shaped all levels of society from parenting to politics. There is no universally accepted definition of human intelligence but one conceptualization is "the ability to remember, reason, plan, and solve novel problems". This course will explore scientific and popular views of the origins of intelligence. The approach will be to read popular science articles and books that deal with intelligence in humans, animals, and machines and locate the primary scientific work on which those claims are made in order to evaluate the rigor and validity of intelligence theories. The course assignments will primarily consist of oral and written critiques of theories and data on the science of intelligence.

**85-362 Seminar on Addiction**

Intermittent: 9 units

This seminar will explore various topics central to the study of drug addiction, with a primary emphasis on psychological and neurobiological theories of drug addiction. We will also discuss research and clinical techniques related to the assessment, diagnosis, and treatment of substance use disorders and related problems. Emphasis will be on alcohol and tobacco, but other drugs will be discussed as well. The main course objective is to provide a unifying model for understanding the fundamental aspects of addiction.

Prerequisites: 85-310 or 85-340 or 85-320 or 85-314

**85-363 Attention, Its Development and Disorders**

Intermittent: 9 units

This seminar will discuss a broad range of topics pertaining to the study of human attention, including: theoretical frameworks and biological foundations of human attention; interrelationship between attention and other aspects of cognition (such as perception, memory, and executive functions); development of attention in infancy and childhood; biological and psychological foundations of attention disorders. Students will be expected to read original research articles, lead and participate in class discussions, and complete a term paper.

Prerequisites: 85-221 or 85-211

**85-370 Perception**

Fall: 9 units

Perception, broadly defined, is the construction of a representation of the external world for purposes of thinking and acting. Although we often think of perception as the processing of inputs to the sense organs, the world conveyed by the senses is ambiguous, and cognitive and sensory systems interact to interpret it. In this course, we will examine the sensory-level mechanisms involved in perception by various sensory modalities, including vision, audition, and touch. We will learn how sensory coding interacts with top-down processing based on context and prior knowledge and how perception changes with learning and development. We will look at methods of psychophysics, neuroscience, and cognitive psychology. The goals include not only imparting basic knowledge about perception but also providing new insights into everyday experiences.

**85-375 Crosscultural Psychology**

Intermittent: 9 units

Human beings share a common genetic inheritance, but our cultural institutions differ in a bewildering variety of ways. This course explores the many different cultural expressions of basic human cognitive and social abilities and needs. We will look at cultural variations in child rearing, mother-child attachment, language socialization, categorization, reasoning, problem-solving, architecture, music, politics, warfare, food-gathering, sex roles, mental disorders, and altered states of consciousness, all with the goal of understanding how the shape of social systems and symbolic expression reflects the economic and adaptive needs of the culture and its people. Among the approaches to these phenomena we will consider are symbolic interaction, cognitive anthropology, dialectic materialism, and modern ethnology.

Prerequisites: 85-211 or 85-198 or 85-102 or 85-100 or 85-219 or 85-241 or 85-221 or 85-261 or 85-251

**85-377 Attitudes and Persuasion**

Intermittent: 9 units

This advanced undergraduate course will focus on the topic of attitude change and how various persuasive techniques are used to shape human response. The dynamics of propaganda and what makes the techniques effective on social and consumer decisions will be addressed. The primary goals of the course are to 1) understand the dynamics of attitude change; 2) explore the mechanism by which attitude change techniques operate and 3) examine relevant theories and research in persuasion. Examples of topics covered include the origins of attitudes, how attitudes influence judgments, social power and attitude change, and how individual decisions are influenced by the mass media. Classic and contemporary research in the area of persuasion will be examined in the form of course readings and assignments.

Prerequisite: 85-241

**85-380 In Search of Mind: The History of Psychology**

Intermittent: 9 units

This course will focus on three aspects of the origin and growth of experimental psychology. The first is the prehistory of psychology, where the connection of the discipline to the development of modern science, and in particular, its origins in philosophy and physiology, is examined. The second focus of the course is on the different approaches and attempts to define the field that have contested for dominance during much of the life of the discipline. The final major focus of the course is on the modern period (roughly the last forty years) where the influences that brought about the modern counter-revolution in psychology will be examined, and where some conjecture about likely future directions will occur. Two prior courses in psychology.

**85-382 The Psychology and Neuroscience of Consciousness**

Intermittent: 9 units

This course will explore consciousness as a scientific problem. It aims to dispel obscurity and mystery to make clear how consciousness can be illuminated empirically and theoretically without losing sight of the "phenomenal". We begin with isolating the basic phenomenon, delve into the conceptual and philosophical background dividing access from phenomenal consciousness, and discuss methods for tracking consciousness. We will then identify two clear questions about 'generic' and 'specific' consciousness. On generic consciousness, we shall explore a set of empirical theories of consciousness and the evidence that supports them. This will include recurrent processing theory, global workspace theory, and higher-order theory among others. On specific consciousness, we will look at neural correlates and experimental interventions to test causal claims about how consciousness arises from the brain, with specific emphasis on sensory consciousness and the role of information and representation. Special topics will likely include the attention in consciousness, consciousness and agency, vegetative state, unconscious sensory processing in normal and lesioned brains, split brain phenomena and abnormal consciousness in psychiatric disorders such as schizophrenia. If possible, we will have a few guest lectures by local experts.

Prerequisites: 85-213 or 85-211 or 85-219

**85-385 Auditory Perception: Sense of Sound**

Intermittent: 9 units

This course explores how our sense of hearing allows us to interact with the world. Students will learn about basic principles of sound, spatial sound, sound quality, hearing impairment, auditory perception, interactions with other modalities, and auditory cognition. Topics may also include musical acoustics, basic auditory physiology, sound-semantic associations, acoustic analysis, and sound-making gestures. We will consider not only simple laboratory-generated signals, but also more complex sounds such as those in our everyday environment, as well music and speech. Students will gain some in-class experience with generating sounds and analytic listening. After students reach a sophisticated level of understanding of the auditory fundamentals, they will apply their knowledge to the study of several current issues in auditory research.

Prerequisites: 85-102 or 85-211

**85-391 Psychology of Sleep**

Intermittent: 9 units

This course is ONLY offered at Carnegie Mellon in Qatar. This course is an advanced seminar that focuses on the biology, psychology, and social factors of sleep and dreaming. The course will go over the history behind the scientific study of sleep, as well as the cultural and psychological underpinnings of dreaming. Students will also delve into the neuroscience and abnormal psychology of sleep. Emphasis will be placed on reading, presenting and analyzing empirical research articles. Students will also be required to fill out sleep logs and a dream diary, culminating in a final research paper analyzing their semester long sleep patterns and dreams based on research discussed in class.

Prerequisites: 85-102 and 85-211

**85-392 Human Expertise**

Intermittent: 9 units

The process of becoming an expert involves many changes, some quantitative and some qualitative. This course will provide an up-to-date account of the theory and data concerning the development of expertise. Questions addressed include the following. What does it take to become an expert? Are experts born or made? Is the process of acquiring expertise common across different domains from music to sports to science? Research studied in the course will employ a variety of methodologies, from case studies to protocol analysis to computational modeling.

Prerequisites: 85-211 or 85-213

**85-393 Memory: Models & Mechanisms**

Intermittent: 9 units

This course will provide a basic understanding of human memory, covering both the many phenomena that have been studied over the years and also how theories have placed these phenomena within a general human cognitive system. The course will treat data and theory as equally important. Theory without empirical evidence is vacuous. Data without an explanatory mechanism is also unsatisfying. The course will cover many of the major principles of human memory starting with how information from the environment is encoded, processed and stored in memory. We will focus on how working memory (think of it as the Human CPU) affects how we encode and retrieve information from memory and what the limits are on this processing machinery. Theories of learning and the mechanisms involved in acquiring information as well as theories of forgetting will be examined in depth, along with variables that affect ease of encoding and obstacles to retrieval. The course will also focus on illusions of memory, how and why human memory is vulnerable to illusions and produces memory distortions. Most phenomena will be discussed in the context of theoretical explanations. Students will also learn about modeling approaches and how the various phenomena have been understood with different theoretical accounts. As a final project each student will develop a model to account for a phenomenon. This will either be fit to an existing body of data, or will take an existing theory, generate a new prediction based on that theory, and design an experiment to test whether the theory is supported or not (the experiment will not be run, but the design and predictions should be clear enough that it could be).

Prerequisite: 85-219

**85-394 Development in Context: Applying Theory and Research to Support Thriving**

Intermittent: 9 units

This course is an advanced seminar that focuses on synthesizing theory and research in developmental psychology and learning sciences so that proposed interventions to support children's development can be designed and evaluated. Theory and research relevant to cognitive, social emotional, and physical development can be applied to facilitate children's thriving in learning, belonging, mental health, and physical health, etc. Students will have an opportunity to select a particular age group and context for focus of independent literature review, a midterm interview project, and a final proposal for research-based intervention.

**85-395 Applications of Cognitive Science**

Spring: 9 units

The famous psychologist George Miller once said that Psychology should "give itself away." The goal of this course is to look at cases where we have done so and #8212; or at least tried. The course focuses on applications that are sufficiently advanced as to have made an impact outside of the research field per se. That impact can take the form of a product, a change in practice, or a legal statute. The application should have a theoretical base, as contrasted, say, with pure measurement research as in ergonomics. Examples of applications are virtual reality (in vision, hearing, and touch), cognitive tutors based on models of cognitive processing, phonologically based reading programs, latent semantic analysis applications to writing assessment, and measures of consumers' implicit attitudes. The course will use a case-study approach that considers a set of applications in detail, while building a general understanding of what it means to move research into the applied setting. The questions to be considered include: What makes a body of theoretically based research applicable? What is the pathway from laboratory to practice? What are the barriers - economic, legal, entrenched belief or practice? The format will emphasize analysis and discussion by students.

Prerequisites: 85-251 or 85-102 or 85-241 or 85-221 or 85-211 or 85-219 or 85-104

**85-401 Introduction to Noninvasive Brain Imaging**

Spring: 9 units

In the past the understanding of the brain's structure and function was limited by the need to access the brain via surgery and postmortem examination. In recent decades, advances in the fields of biology, psychology, physics, and engineering, have led to a slew of noninvasive methods for looking at the brain structure and function. These methods have become widespread in both clinical and research settings. This course will provide a survey of some of the most prominent of these neuroimaging methodologies, their advantages and disadvantages, and examples of their use. Topics covered include electroencephalography (EEG), computed tomography (CT), functional near-infrared spectroscopy (fNIRS), positron emission tomography (PET) and magnetic resonance imaging (MRI). Pre reqs listed or by permission of the course instructor.

Prerequisites: 03-121 or 85-219 or 85-102 or 03-151

**85-402 Multilevel Modeling**

Intermittent: 9 units

This course introduces a number of expressions of multilevel modeling that are now in common use in all the major branches of psychology, as well as in education and other sciences. The course balances conceptual understanding of MLM with practical, lab-based application. A working knowledge of R or SAS statistical software will be advantageous but not required.

Prerequisites: 36-309 or 85-309

**85-406 Autism: Psychological and Neuroscience Perspectives**

Fall: 9 units

Autism is a disorder that affects many cognitive and social processes, sparing some facets of thought while strongly impacting others. This seminar will examine the scientific research that has illuminated the nature of autism, focusing on its cognitive and biological aspects. For example, language, perception, and theory of mind are affected in autism. The readings will include a few short books and many primary journal articles. The readings will deal primarily with autism in people whose IQ's are in the normal range (high functioning autism). Seminar members will be expected to regularly enter to class discussions and make presentations based on the readings. The seminar will examine various domains of thinking and various biological underpinnings of brain function, to converge on the most recent scientific consensus on the biological and psychological characterization of autism. There will be a special focus on brain imaging studies of autism, including both structural (MRI) imaging of brain morphology and functional (fMRI and PET) imaging of brain activation during the performance of various tasks.

Prerequisites: 85-429 or 85-219 or 85-213 or 85-211 or 85-355

**85-407 How the Brain Makes Meaning**

Intermittent: 9 units

Conceptual knowledge underpins all aspects of everyday experience, from language, to thinking, to recognizing familiar objects, people and places. This seminar will survey major theories and findings about how the brain represents 'meaning.' The course will emphasize research using neuropsychological methods in brain-damaged patients and functional neuroimaging in healthy participants. Students will read primary empirical and theoretical review articles to develop an understanding of both classic findings and recent discoveries about how the human brain represents meaning.

Prerequisites: (85-219 or 85-211) and (36-201 or 36-200)

**85-408 Visual Cognition**

Intermittent: 9 units

Recognizing an object, face or word is a complex process which is mastered with little effort by humans. This course adopts a three-pronged approach, drawing on psychological, neural and computational models to explore a range of topics including early vision, visual attention, face recognition, reading, object recognition, and visual imagery. The course will take a seminar format.

Prerequisites: 85-213 or 85-211 or 85-219

**85-409 Stigma and its Consequences**

All Semesters: 9 units

This seminar will introduce students to theoretical and empirical psychological research on prejudice and social stigma. The topics covered will include examinations of why individuals stigmatize: exploring cognitive, evolutionary, self, and system justification explanations. The course will examine the consequences of stigmatization for low-status groups (e.g., stereotype threat, dis-identification, internalization, health outcomes). We will explore the role of stigma in intergroup interactions and variation in the experience of stigma. Specific course topics will include the meaning of stigma, why people stigmatize, the physiological, cognitive-affective and social behavioral processes linking stigma and health outcomes, and moderators of stigma.

**85-412 Cognitive Modeling**

Spring: 9 units

This course will be concerned with modeling of agent behavior in a range of applications from laboratory experiments on human cognition, high-performance simulations such as flight simulators, and video game environments. The first half of the course will teach a high-level modeling language for simulating human perception, cognition, and action. The second half of the course will be a project in which students develop a simulated agent or agents for the application of their choice.

Prerequisites: 15-251 or 15-210 or 15-150 or 15-122

**85-414 Cognitive Neuropsychology**

Spring: 9 units

This course will review what has been learned of the neural bases of cognition through studies of brain-damaged patients as well as newer techniques such as brain stimulation mapping, regional metabolic and blood flow imaging, and attempt to relate these clinical and physiological data to theories of the mind cast in information-processing terms. The course will be organized into units corresponding to the traditionally-defined subfields of cognitive psychology such as perception, memory and language. In each area, we will ask: To what extent do the neurological phenomena make contact with the available cognitive theories? When they do, what are their implications for these theories (i.e., Can we confirm or disconfirm particular cognitive theories using neurological data?)? When they do not, what does this tell us about the parses of the mind imposed by the theories and methodologies of cognitive psychology and neuropsychology?

Prerequisites: 85-219 or 85-211

**85-417 Multilingual Minds and the Brain**

Fall: 9 units

Does multilingualism change your mind, literally and figuratively? In this course, we will examine several topics related to the differences between mono- and multilinguals. First, how juggling several languages in one brain may "train" certain skills so the multilingual mind processes information differently, even when that information is not language related. Second, how patterns of neural activation may also differ in mono- and multilinguals, changing language processing at that level. Third, how contexts of use and acquisition of different languages may affect how we process information in each one, changing how one makes decisions in each language they speak. We will use original sources to try and answer that initial question. Further, we will analyze published research and propose ways of developing it further.

Prerequisites: 85-320 or 85-340 or 85-330 or 85-310 or 85-309 or 36-309

**85-418 Infant development: Inside the Mind of Babies**

Intermittent: 9 units

This course will provide an overview of development in infancy with a focus on the emerging mind. A basic knowledge of developmental issues is assumed. We will cover the key aspects of infancy but with a primary focus on perception (seeing), cognition (thinking), and action (doing). Each week, students will be required to read a chapter in a textbook as well as short advanced empirical paper, often with conflicting accounts of a phenomenon. The instructor will introduce the key concepts, issues, and lines of research, but in each case students are expected to take an active role in discussing and developing ideas about the topic under consideration. Research methods specific to the study of infant development will be emphasized. Major issues that will be discussed include theories of developmental change, continuity in development, the nature of the psychological mechanism that underpin change, the relative contributions of heredity and environment, and the notion that all change occurs through a series of development cascades.

Prerequisite: 85-221

**85-419 Introduction to Parallel Distributed Processing**

Spring: 9 units

This course provides an overview of Parallel-Distributed-Processing/ neural-network models of perception, memory, language, knowledge representation, and learning. The course consists of lectures describing the theory behind the models as well as their implementation, and their application to specific empirical domains. Students get hands-on experience developing and running simulation models.

Prerequisites: 21-112 or 21-120 or 21-111 or 21-115 or 21-124

**85-421 Language and Thought**

Intermittent: 9 units

This course allows the student to explore ways in which the mind shapes language and language shapes the mind. Why are humans the only species with a full linguistic system? Some of the questions to be explored are: What kinds of mental abilities allow the child to learn language? What are the cognitive abilities needed to support the production and comprehension of sentences in real time? How do these abilities differ between people? Are there universal limits on the ways in which languages differ? Where do these limitations come from cognition in general or the specific language facility? Why is it so hard to learn a second language? Are there important links between language change and cultural change that point to links between language and culture?

Prerequisites: 80-150 or 85-213 or 85-211 or 80-180

**85-422 Clinical Psychology: Science and Practice**

Spring: 9 units

In this course, students will be exposed to the science and practice of clinical psychology, with a particular emphasis on the synergistic relationship between clinical psychological research and clinical practice. We will focus on the four major activities that clinical psychologists engage in (research, assessment, diagnosis, and psychotherapy). Students will learn about the clinical characteristics of major psychological disorders and the empirically-validated treatments available for these conditions. We will make frequent use of research findings and the scientific method to evaluate and understand concepts in clinical psychology. Critical thinking will be emphasized as we explore the scientific strengths and limitations of various treatments for psychological disorders. This course is designed to be a smaller seminar course for juniors and seniors considering graduate school in clinical psychology.

Prerequisites: 85-261 or 85-310 or 85-340 or 85-314 or 85-104 or 85-320

**85-423 Cognitive Development**

Intermittent: 9 units

The general goals of this course are that students become familiar with the basic phenomena and the leading theories of cognitive development, and that they learn to critically evaluate research in the area. Piagetian and information processing approaches will be discussed and contrasted. The focus will be upon the development of children's information processing capacity and the effect that differences in capacities have upon the child's ability to interact with the environment in problem solving and learning situations.

Prerequisite: 85-221

**85-424 Hemispheric Specialization: Why, How and What?**

Intermittent: 9 units

The brain is divided into two hemispheres, raising a host of questions about brain organization, hemispheric specialization and laterality. Despite all the research devoted to these questions, our understanding of the behavioral significance and neural basis of laterality remains limited. This course will address the questions of "why", "how" and "what". We will review the latest data and empirical results but will also develop a coherent theoretical perspective, moving from molecular, genetic and evolutionary considerations to cognitive and clinical factors in the understanding of one of the most fascinating phenomena in neuroscience, neuropsychology, psychiatry, neurology, and cognitive sciences. In addition to tackling a major text in the field (The Two Halves of the Brain Edited by Hugdahl and Westerhausen), we will read the latest papers in the field. The class will be almost entirely discussion-based and students will be responsible for doing the readings ahead of time and being prepared for the discussion.

Prerequisites: 85-251 or 85-221 or 85-241

**85-425 Child Psychopathology and Treatment**

Intermittent: 9 units

The first half of this course will focus on understanding the etiology and epidemiology of child and adolescent psychopathology. Special emphasis will be placed on conditions that are first diagnosed during childhood (e.g., ADHD, Autism, Eating Disorders) as well as understanding how child and adult psychopathology differ. The second half of this course will focus on treatment interventions for youth with psychopathology. Students will learn about how interventions for adults with psychopathology are altered to be developmentally appropriate for children, and methods of intervention commonly used with children but less so with adults (e.g., family therapy, play therapy). For students who have completed abnormal psychology and the psychology breadth requirement but not the other course pre-requisite, 85102, please see Theresa Kurutz to register for this course in BH 343.

Prerequisites: 85-261 and 85-102

**85-426 Learning in Humans and Machines**

Spring: 9 units

This course explores how probabilistic methods can help to explain cognition and to develop intelligent machines. The applications discussed include perception, language, memory, categorization, reasoning, decision-making, and motor control.

Prerequisite: 15-112

**85-427 Metacognition: thinking about one's own thinking**

Intermittent: 9 units

The course focuses on understanding metacognition, the marvelous ability of humans to inspect, understand, and regulate their own cognition. How do we know what we do or do not know? How good are we at estimating the accuracy of our memories of the past? How about what we will remember or forget in the future? Can we use such knowledge to do better? The study of metacognition provides an answer to these and many more questions. In other words, metacognition is the path to better knowing yourself.

Prerequisites: 85-211 or 85-219

**85-429 Cognitive Brain Imaging**

Spring: 9 units

This seminar will examine how the brain executes higher level cognitive processes, such as problem-solving, language comprehension, and visual thinking. The topic will be addressed by examining what recent brain imaging studies can tell us about these various kinds of thinking. This new scientific approach has the potential of providing important information about how the brain thinks, indicating not only what parts perform what function, but also how the activity of different parts of the brain are organized to perform some thinking task, and how various neurological diseases (e.g. aphasia, Alzheimer's) affect brain activity. A variety of different types of thinking will be examined, including short-term working memory storage and computation, problem solving, language comprehension, visual thinking. Several different technologies for measuring brain activity (e.g. PET and functional MRI and also some PET imaging) will be considered, attempting to relate brain physiology to cognitive functioning. The course will examine brain imaging in normal subjects and in people with various kinds of brain damage.

Prerequisites: 85-419 or 85-414 or 85-412 or 85-213 or 85-211

**85-432 Data Science for Psychology and Neuroscience**

Intermittent: 9 units

This course will cover advanced topics in statistics and experimental design necessary for applied research in modern psychology, including information design, exploratory data analysis, data visualization, nonparametric statistics, data and inference errors (multicollinearity, overfitting, Simpson's and Robinson's paradox), sanitization (data anonymization, de-identification), and linear models (including conditional process models). Students will get hands on experience with simulating, analyzing, and visualizing data in the R statistical environment.

Prerequisites: 85-309 or 36-309

**85-435 Biologically Intelligent Exploration**

Intermittent: 9 units

Humans and other mammals exhibit a high degree of control when selecting actions in noisy contexts, quickly adapting to unexpected outcomes in order to better exploit opportunities arising in the future. This course will explore both the cognitive and neurobiological systems of adaptive decision-making, through a mixture of readings, lectures, and hands-on modeling projects (in Python and Matlab).

Prerequisites: (85-211 or 85-213) and (21-111 or 21-115 or 21-120)

**85-438 Educational Goals, Instruction, and Assessment**

Fall: 9 units

This course will meet in TQ 1308 The aim of this course is to teach students how to develop educational goals based on a detailed task analysis of the knowledge, skills, and dispositions required for mastery of a particular aspect of a domain. Goals for early childhood, elementary, middle school, and high school will be discussed and related to the state and national standards. A comprehensive understanding of student achievement will be developed. The importance of matching the instructional program and its assessment to goals will be discussed and demonstrated. Assessment that focuses on covering the full range of specified goals will be studied along with diverse approaches for valid assessment. Other topics include making instructional material choices, funding, classroom management, ethics, and relation to system-level policies. Assignments will emphasize linking goals - instruction assessment. A term project will consist of an in-depth study of one central unit in a discipline or grade level. This course will meet in TQ 1308

**85-442 Health Psychology**

Intermittent: 9 units

This course is concerned with how behavior and psychological states influence the development of and recovery from disease. The class provides an overview of existing psychological and epidemiological data on the relationship between behavior and disease and addresses the issue of how behavior, emotion and cognition can influence the disease processes. Topics include: measures and concepts, stress and disease, stress and coping, personal control, helplessness and disease, social support and health, reactivity to stress, behavior and hypertension, coronary heart disease, infectious diseases and immune function, and the effectiveness of behavioral interventions in health.

Prerequisites: 36-200 and (85-221 or 85-219 or 85-211 or 85-102 or 85-104 or 85-251 or 85-241)

**85-443 Social Factors and Well-Being**

Intermittent: 9 units

This course will focus on the role that our social environment plays in our feelings of well-being and in the maintenance of our mental and physical health. Topics to be discussed include marriage, widowhood, loneliness, social support, social participation, social aspects of personality (e.g., social anxiety, extraversion, agreeableness, and hostility), social stressors (betrayal and conflict), discrimination, and socioeconomic status. We will consider how each social factor develops, the extent to which we can alter it or its effects on our lives, and how it influences our overall well-being.

**85-444 Relationships**

Fall: 9 units

The primary goal of this course is to introduce you to social psychological theory and research on the topic of relationships. Although a variety of relationship phenomena will be discussed, a heavy emphasis will be placed on research that addresses fundamental processes in close relationships. The coverage of material will include a review of historical roots and classic approaches to the scientific study of relationships, as well as exciting new research and theory on particular subtopics. The majority of class time is spent discussing and evaluating recent research. Special emphasis also is given to learning and critically evaluating the methodological tools that are used to study close relationships. This is an advanced seminar in which students will be expected to read original research articles and chapters on assigned topics and come to class prepared to discuss the material. Readings will consist of theoretical and empirical articles from psychology journals and related sources. Additional course requirements will involve short, weekly writing assignments, student presentations of research articles, and a written research proposal. Over the course of the semester, students will design and carry out a small-scale, original investigation on a relationships topic of interest.

Prerequisites: 85-330 or 85-314 or 85-311 or 85-310 or 85-320 or 85-300 or 85-340

**85-446 Psychology of Gender**

Spring: 9 units

This course is devoted to the investigation of psychological gender rather than biological sex. That is, sex differences will be explored from a social psychological (e.g., socialization) perspective. Implications of both male gender role and female gender role in the areas of relationships and health will be the course focus.

Prerequisites: 85-241 or 85-251

**85-480 Internship in Clinical Psychology**

All Semesters

This course allows students to gain applied clinical experience in a mental health setting. Students will work alongside psychology professionals at designated field placements. This course is designed to help students apply and expand their knowledge of clinical psychology and to develop appropriate professional work standards. Students will spend the majority of their time (8 hours per week) in an applied clinical setting, with a one hour per week supervision meeting with Dr. Creswell. Instructor permission is required, 85-104 Psychopathology can be taken as either a pre req or a co req. Please contact Dr. Kasey Creswell.

Prerequisites: 85-261 Min. grade B or 85-104 Min. grade B

**85-481 Seminar in Intervention**

Intermittent: 9 units

This course is an introduction to the therapeutic process. Students will be introduced to a variety of therapeutic approaches and techniques (e.g. Solution-Focused, Cognitive, Client Centered, etc.) and will have the opportunity to learn the basic skills associated with each (e.g. Cognitive Restructuring, Mirroring, Empathic Highlighting, etc.). Instruction will entail a mix of discussion and demonstration, and there will be a heavy emphasis on in-class practice of these skills.

**85-482 Internship in Psychology**

Fall and Spring

The Internship in Psychology is designed to enable students to gain experience in professional settings related to their studies in Psychology and earn credit for the intellectual work involved. It is the students responsibility to locate an internship site and on-site supervisor, as well as to identify a CMU faculty sponsor. The student registers for the internship by submitting a completed internship form to Emilie O'Leary emilier@andrew.cmu.edu.

**85-483 Internship in Psychology - Mini**

Fall and Spring

The Internship in Psychology is designed to enable students to gain experience in professional settings related to their studies in Psychology and earn credit for the intellectual work involved. It is the students responsibility to locate an internship site and on-site supervisor, as well as to identify a CMU faculty sponsor. The student registers for the internship by submitting a completed internship form to Lauren McCarthy (laurenmc@andrew.cmu.edu).

**85-484 Practicum in Child Development**

Fall and Spring

This guided field experience is designed to help students deepen their understanding of developmental psychology by assisting in a preschool or kindergarten classroom and discussing the ways that their experiences relate to the theories they have learned previously and to new readings. Each student will individually schedule a consistent 6 hours per week helping in a Children's School classroom (preferably 2 or 3 chunks of time). Classroom duties will include working one-on-one and with small groups of students as they do puzzles, art projects, dramatic play, etc., as well as helping with snack, playground supervision, classroom cleanup, and storytime. Each student will be expected to keep a journal 1) relating general experiences to developmental theories and 2) documenting the development of a particular child during the semester. All students will meet for a 1 hour weekly discussion with the director. Discussion topics and related readings will be selected collaboratively, based on issues/questions raised by the group's observations and discussions. This course is typically 9 units, but may be negotiable between 3 and 9.  
Prerequisite: 85-221

**85-501 Readings in Developmental psychology**

Intermittent: 9 units

tba please reach out to Emilie O'Leary emilier@andrew.cmu.edu

**85-505 Readings In Psychology**

All Semesters

As the name implies, the emphasis in the Reading course is on reading articles and books in some specified area. The students work in the course must lead to the production of a written paper which will be read by the instructor directing the readings. Often the reading is related to a research project which the student may wish to conduct. Readings courses have also been used to give students an opportunity to receive instruction in areas which are not included elsewhere in our course listing. The course may be taken for any number of units up to 9, depending upon the amount of work to be done.

**85-506 Readings in Psychology**

Fall and Spring

As the name implies, the emphasis in the reading course is on reading articles and books in some specified area. The students work in the course must lead to the production of a written paper which will be read by a psychology faculty instructor directing the readings. Often the reading is related to a research project which the student may wish to conduct. Reading courses have also been used to give students an opportunity to receive instruction in areas which are not included elsewhere in our course listing. The course may be taken for any number of units up to 9, depending upon the amount of work to be done. This course is special permission and can only be added in consultation with a psychology faculty member and registered by the Undergraduate administrator, Emilie O'Leary emilier@andrew.cmu.edu.

**85-507 Research in Psychology**

Fall

This course may include field study, applied work, or laboratory research. The student should have previous training in the basic research skills that will be used in his/her project, especially statistical methods and experimental design. Independent Research Projects will be supervised by a faculty member and must result in a written paper. It is the students responsibility to make arrangements for independent study courses with individual faculty members. This should be done the semester before a student wishes to register for one of these courses. The course may be taken for any number of units up to 12, depending upon the amount of work to be done. Please contact the CMU psychology faculty member you wish to work with to get approval to enroll then email Emilie Rendulic at emilier@andrew.cmu.edu in order to be registered for the course.

**85-508 Research in Psychology**

Spring

This course may include field study, applied work, or laboratory research. The student should have previous training in the basic research skills that will be used in his/her project, especially statistical methods and experimental design. Independent Research Projects will be supervised by a faculty member and must result in a written paper. It is the students responsibility to make arrangements for independent study courses with individual faculty members. This should be done the semester before a student wishes to register for one of these courses. The course may be taken for any number of units up to 12, depending upon the amount of work to be done.

**85-509 Research in Psychology Practicum**

Fall and Spring: 1 unit

All students registered for research units via 85-198 or 85-507/508 \* to register, in addition, for this 1 unit course. This course will meet every other week (online, at a time to be determined by survey). This course will provide students with an opportunity to frame their research experience in a broader professional and scholastic perspective, as well as an opportunity to get feedback on ongoing research experiences. Topics to be covered include professional development, protections for researchers and participants (including Title IX), problem solving, and communication. Students will complete short homework assignments in relation to each topic as a way of maintaining engagement with the course materials, as well as brief written assignments reflecting on their research experience. Students will be connected with resources like the Global Communications Center and the Career and Professional Development Center to help students contextualize their research experience in ways that contribute to their ongoing professional aspirations.

**85-601 Senior Thesis**

Fall

This course is intended for senior Psychology or Cognitive Science majors who wish to conduct a research project under the direction of a faculty advisor. The project topic is to be selected jointly by the student and the advisor. The project will culminate in a senior paper which will be presented to the Department Head at the end of Fall Semester. Prerequisite: Grade of B or better in a previous research course required to enter, grade of B or better in first semester of senior thesis course required to complete, and permission of instructor. A formal proposal is required in the first semester. This course differs from the Honors Thesis sequence (66-501,502) in that it does not require Honors standing in HSS (i.e., there are no QPA requirements). This course differs from Research in Psychology (85-507,508) in that the student's original contribution to the research is expected to be more substantial, and in that a final written report of the project is to be presented to the Department.

**85-602 Senior Thesis**

Spring

This course is intended for senior Psychology or Cognitive Science majors who wish to conduct a research project under the direction of a faculty advisor. The project topic is to be selected jointly by the student and the advisor. The project will culminate in a senior paper which will be presented to the Department Head at the end of Fall Semester. Prerequisite: Grade of B or better in a previous research course required to enter, grade of B or better in first semester of senior thesis course required to complete, and permission of instructor. A formal proposal is required in the first semester. This course differs from the Honors Thesis sequence (66-501,602) in that it does not require Honors standing in HSS (i.e., there are no QPA requirements). This course differs from Research in Psychology (85-507,508) in that the student's original contribution to the research is expected to be more substantial, and in that a final written report of the project is to be presented to the Department.

**85-730 Analytic Research Methods**

Intermittent: 12 units

This class will teach students how to apply six major non-experimental research methods used in analytic behavioral analysis. Protocol Analysis. This method is used to study patterns and changes in problem-solving and their matches to theoretical models, including computational models. Corpus Analysis. This method is used to isolate patterns of behavioral and communication usage and change, as revealed through the study of the world-wide web and large computerized databases such as CHILDES, TalkBank, or the British National Corpus. Tools here include text searches and data-mining. Conversation Analysis. This is a microanalytic method used to examine sequencing, repair, and orientation in closely transcribed recordings of spoken interactions, as made available through systems such as the CABank database, as well as recorded programs on YouTube and elsewhere. Coding Systems. This approach seeks to capture interactional and behavioral structures in writing, teaching, interview, and other interactions. Here, there will be a special emphasis on the coding of instructional interactions. Gesture Analysis. This microanalytic method seeks to track patterns in gestural and nonverbal communication, often in association with spoken messages. Profile Analysis. This approach studies differences across learners at various ages and ability levels and group differences involving aphasia, autism, stuttering, dementia, and other individual differences. Students will work with data already available from previous studies, and will also learn to collect their own new datasets. Although the data being examined have been generated through naturalistic processes, they can be analyzed quantitatively using time-series analyses, non-parametric statistics, error matrices, and neural network simulations. In these various analyses, we will also consider how behavioral patterns are shape

**85-747 Stress and Health Across Lifecourse**

Intermittent

This seminar is designed to delve deeper into the topic of stress and health with a life course perspective. The aims of this course is to help students develop the conceptual and methodological skills necessary for interpreting empirical studies (as well as claims in pop culture) in this area of research and to understand the critical roles of time and timing. To facilitate these goals, the course will combine brief lectures, discussion of readings, oral presentations, and writing.

**85-753 Mindfulness: Science and Practice**

Intermittent

This course will focus on blending first-person experience with mindfulness practices (including mindfulness meditation) and learning about the scientific research on mindfulness. Students will engage in guided mindfulness exercises, develop a daily mindfulness practice, and try out different mindfulness training traditions. In addition, much of this course will be focused on applying a critical eye to the theory, measures, mechanisms, and effects of mindfulness (and mindfulness training interventions) across multiple domains cognition, social processes, behavior, biological mechanisms, and health. As such, this will be a small seminar course focused developing first-person experiences of mindfulness and on discussing the debates and opportunities related to the emerging science of mindfulness.

**85-762 Seminar on Addiction**

Fall: 9 units

This seminar will explore various topics central to the study of drug addiction, with a primary emphasis on psychological and neurobiological theories of drug addiction. We will also discuss research and clinical techniques related to the assessment, diagnosis, and treatment of substance use disorders and related problems. Emphasis will be on alcohol and tobacco, but other drugs will be discussed as well. The main course objective is to provide a unifying model for understanding the fundamental aspects of addiction.

**85-765 Cognitive Neuroscience**

Intermittent: 9 units

This course will cover fundamental findings and approaches in cognitive neuroscience, with the goal of providing an overview of the field at an advanced level. Topics will include high-level vision, spatial cognition, working memory, long-term memory, learning, language, executive control, and emotion. Each topic will be approached from a variety of methodological directions, for example, computational modeling, cognitive assessment in brain-damaged humans, non-invasive brain monitoring in humans, and single-neuron recording in animals. Lectures will alternate with sessions in seminar format. Prerequisites: Graduate standing or two upper-level psychology courses from the areas of developmental psychology, cognitive psychology, computational modeling of intelligence, neuropsychology or neuroscience.

**85-793 Memory: Models & Mechanisms**

Intermittent

This course will provide a basic understanding of human memory, covering both the many phenomena that have been studied over the years and also how theories have placed these phenomena within a general human cognitive system. The course will treat data and theory as equally important. Theory without empirical evidence is vacuous. Data without an explanatory mechanism is also unsatisfying. The course will cover many of the major principles of human memory starting with how information from the environment is encoded, processed and stored in memory. We will focus on how working memory (think of it as the Human CPU) affects how we encode and retrieve information from memory and what the limits are on this processing machinery. Theories of learning and the mechanisms involved in acquiring information as well as theories of forgetting will be examined in depth, along with variables that affect ease of encoding and obstacles to retrieval. The course will also focus on illusions of memory, how and why human memory is vulnerable to illusions and produces memory distortions. Most phenomena will be discussed in the context of theoretical explanations. Students will also learn about modeling approaches and how the various phenomena have been understood with different theoretical accounts. As a final project each student will develop a model to account for a phenomenon. This will either be fit to an existing body of data, or will take an existing theory, generate a new prediction based on that theory, and design an experiment to test whether the theory is supported or not (the experiment will not be run, but the design and predictions should be clear enough that it could be).

**85-851 Personality and Health**

Intermittent

The general purpose of this course is to examine possible connections between personality and physical well-being. Material will be presented at the outset of the semester that is designed to enable students to understand more fully how psychologists think about the concept of personality (what it is and what it does for us), how it is assessed, and how personality and health psychologists do research on the topic. As the semester progresses, we will explore and discuss research that links certain aspects of personality to health, illness, and mortality. The list of personality characteristics to be considered includes (but is not necessarily limited to) optimism/pessimism, conscientiousness, hostility, trait positive and negative affect, life purpose, and chronic goal adjustment strategies. As time permits, select person variables will also be considered, e.g., the impact of depressive mood on health. Class time will be largely taken by discussion of original research papers. Different sets of students will be responsible for leading these discussions. Grades will be based on a combination of class participation, quality of paper presentations, and performance on a final research paper.