

Course Modules:

Unit 1: Evolution, Mind, and Brain

Nervous system - anatomy and physiology; Functional neuroanatomy; Tools for investigation – electrophysiology, imaging, and others; how the brain creates mind?; Translation to behavior — emotion/cognition/decision making; mental representations and processing; dissociations and associations.

Unit 2: The Indian Knowledge System

Six Schools of philosophy; Buddhism; Bhagavad Gita; Mapping with the Neuroscientific/psychological understanding from Unit 1; Mental health; cognition in Samkhya and yoga; the body–mind – intellect – consciousness complex; consciousness; panca – kosa – a five layered existence; four states of existence; driving issues in consciousness studies; the tri – guna system; cognitive training hypothesis in yoga; psychological effects of yoga/meditation with clinical and nonclinical populations; Extraordinary cognition hypothesis via eightfold path described in the Yogasutras. Relative versus absolute reality hypothesis.

Unit 3: Perception and Attention

Introduction to perception; visual perception; structure of visual system; top-down (context effects) and bottom-up (from features to objects) processing; visual recognition; interactive nature of perception; nature and roles of attention; failures of selection; successes of selection; information processing theories of attention; electrophysiology and human attention; functional neuroimaging and transcranial magnetic stimulation.

Unit 4: Representation, Encoding, and Retrieval of Knowledge in Long-Term Memory

Role of knowledge in cognition; representations and their formats; representation to category knowledge; structures in category knowledge; category domains and organization; nature of long-term memories; encoding; retrieval; encoding with difficulty to recall; non-declarative memory systems.

Unit 5: Working Memory and Executive Processes

Introduction to working memory; from primary memory to working memory; working memory models; person-to-person variation; dopamine's role; frontal lobe connection; frontal damage and the frontal hypothesis; executive attention; switching attention; inhibition of response; sequencing; monitoring.

Unit 6: Emotion, Cognition, Decision-making, and Problem Solving

Defining emotion; manipulating and measuring emotion; emotional learning: acquiring

evaluations; emotion and declarative memory; emotion, attention, and perception; nature of a decision; rational decision making; neural bases of expected utility calculations; human decision making and the expected utility model; complex, uncertain decision making; nature of problem solving; analogical reasoning; inductive reasoning; deductive reasoning.

Unit 7: Language, Motor Cognition, and Mental Simulation

Nature of language; processes of language comprehension; processes of language production; language, thought, and bilingualism; nature of motor cognition; mental simulation and the motor system; imitation; biological motion.