

PSY-808: Applications of Cognitive Science

Credit Hours:

3+0

Prerequisites:

None

Course Objectives:

This course explores how insights from cognitive science, an interdisciplinary field encompassing psychology, neuroscience, linguistics, philosophy, anthropology, computer science, and education, are applied to real-world contexts. Students will analyze how theories of perception, memory, learning, language, reasoning, and decision-making inform innovations in education, learning technology, health, business, and artificial intelligence. Through case studies, critical debates, and applied projects, the course will highlight how cognitive science research is translated into practice to address complex human challenges. By the end of the course, the students will be able to:

1. Explain the core principles and methodologies of cognitive science.
2. Evaluate how cognitive science theories are applied in various domains such as education, technology, and health.
3. Critically analyze the ethical and societal implications of applying cognitive science research.
4. Design interventions or technologies informed by cognitive science principles.
5. Integrate interdisciplinary perspectives to propose innovative applications.

Course Contents:

- Introduction to Cognitive Science and Its Applications (Historical foundations and interdisciplinary scope, Translating theory into practice)
- Perception and Human-Computer Interaction (Principles of visual/auditory perception, Applications in interface and UX design)
- Memory and Learning Technologies (Cognitive models of memory and forgetting, Applications in instructional design, e-learning, and adaptive systems)
- Attention and Cognitive Load (Limits of attention and multitasking, Applications in education, workplace design, and media)
- Language and Communication (Cognitive perspectives on language acquisition and processing, Applications in literacy, bilingualism, AI language models)
- Reasoning, Problem-Solving, and Decision-Making (Cognitive biases and heuristics, Applications in education)
- Motivation, Emotion, and Learning (Emotional-cognitive interactions, Applications in classroom engagement, persuasive technology, and therapy)

- Cognitive Neuroscience Applications (Brain imaging and neuroplasticity, Applications in neuroeducation, brain–computer interfaces, and rehabilitation)
- Artificial Intelligence and Cognitive Modeling (Computational models of cognition, AI applications inspired by cognitive processes)
- Cognitive Science in Health and Well-being (Cognitive-behavioral interventions, Applications in mental health and aging)
- Cultural and Social Dimensions of Cognition (Cross-cultural cognition and learning, Applications in global education and organizational diversity)
- Ethical, Philosophical, and Future Perspectives (Ethics of cognitive enhancement and neurotechnology, Future of applied cognitive science)

Course Learning Outcomes:

At the end of the course, the students will be able to:

1. Demonstrate knowledge of key cognitive science applications in diverse real-world contexts.
2. Critically engage with empirical research and apply findings to problem-solving.
3. Develop evidence-based solutions for education, technology, or organizational practices.
4. Present applied projects that bridge theory and practice.

Reference Materials/ Books:

1. Anderson, J. R. (2010). *Cognitive Psychology and Its Implications*.
2. Gazzaniga, M. (2018). *The Consciousness Instinct: Unraveling the Mystery of How the Brain Makes the Mind*.
3. Pinker, S. (2007). *The Stuff of Thought: Language as a Window into Human Nature*.
4. Norman, D. A. (2013). *The Design of Everyday Things*.
5. Kahneman, D. (2011). *Thinking, Fast and Slow*.
6. Sawyer, R. K. (Ed.). (2014). *The Cambridge Handbook of the Learning Sciences*.
7. Clark, A. (2016). *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*