



COGNITION AND ITS COMPUTATION

PROF. SHARBA BANDYOPADHYAY

Department of Electronics and Electrical Communication Engineering

PROF. RAJLAKSHMI GUHA

Department of Electronics and Electrical Communication Engineering
IIT Kharagpur

PRE-REQUISITES : 1st year college Mathematics and Biology

INTENDED AUDIENCE : Students interested in Neural and Cognitive Sciences

INDUSTRY SUPPORT : AI related industry

COURSE OUTLINE :

Information as representation of knowledge is the object of study of an emergent scientific field - Cognitive Science. Increasing applications in Human-centered design, BMI and BCI, where actors like the structural, functional and computational mechanisms of the brain are engaged, necessitates advanced knowledge and research in "Cognition and its Computation". The proposed course will dwell on the fundamentals of Cognitive Processing in humans and will also discuss some recent challenges, discoveries and some open problems. The course will include topics on both understanding natural and developing artificial cognitive information processing systems.

ABOUT INSTRUCTOR :

Prof. Sharba Bandyopadhyay works in the area of Auditory Neuroscience using experimental neurophysiology, computational and theoretical methods. Sharba's primary interest is in developmental and fast time scale plasticity. Prof. Rajlakshmi Guha works in the area of experimental cognition and affective neuroscience. Her primary interests lie in exploring visual cognition in different mental health conditions, with focus on anxiety and depression in young adults. Website: <http://www.iitkgp.ac.in/department/RX/faculty/rx-raig>

COURSE PLAN :

Week 1: Introduction to Cognition and Computation

Week 2: Neurobiology of Cortical Networks

Week 3: Neural Plasticity

Week 4: Attention

Week 5: Perception

Week 6: Learning and Memory (I)

Week 7: Learning and Memory (II)

Week 8: Speech and Language (I)

Week 9: Speech and Language (II)

Week 10: Problem Solving and Decision Making

Week 11: Disorders of Language and Thought

Week 12: Open Questions