

LEARNING ABOUT LEARNING: A COURSE ON NEUROBIOLOGY OF LEARNING AND MEMORY



**BIOTECHNOLOGY
& BIOSCIENCES**



PROF. BALAJI JAYAPRAKASH
Centre for Neuroscience
IISc Bangalore

TYPE OF COURSE : New | Elective | UG/PG
INTENDED AUDIENCE : Advanced UG, MSc, PhD

COURSE DURATION : 4 weeks (28 Jan'19 -22 Feb'19)
EXAM DATE : 31 March 2019

INDUSTRIES APPLICABLE TO : Reinforcement Learning Based Industries, Learning Systems, Reward Mechanisms, Consulting Industry

COURSE OUTLINE :

In this course we propose to teach the rules governing learning and how they result in storage of information in the form of memory. The course structure is such that the lectures introduce the student/listener to the fundamental rules that determine learning through a historical perspective. Such a design helps the listener/student to understand how these rules came about, what were the experimental observations that led to the rules. In the course we will be using these rules and apply to various situations and experimental setting and analyse the behavioural outcomes. The framework for understanding associative learning is presented in the first few lectures followed by reinforcement learning/instrumental conditioning. In the end synergistic views of both the learning are presented followed by description of some of the modern behavioural paradigms. Towards the later part of the course the lectures connect these behavioural studies to molecular underpinnings.

ABOUT INSTRUCTOR :

Dr. Jayaprakash is an Assistant Professor at the Centre for Neuroscience, Indian Institute of Science Research:

- ✓ Learning and Memory Post Doctoral Fellow with Prof. Silva, Department of Neurobiology, UCLA, Los Angeles, July 2007- Dec 2011 .
- ✓ Post Doctoral Fellow with Prof. Ryan, Department of Biochemistry, Weil Medical College of Cornell University, New York, NY - 10021. USA, 2005 - 2007 .
- ✓ Tata Institute of Fundamental Research, Visiting Fellow, 2004 - 2005.
- ✓ Institute of Fundamental Research, Ph.D. (Chemistry), 2004.

COURSE PLAN :

Week 01 : Introduction, Ebbinghaus, Lashley, Penfield, Brenda Millner, Memory Classification

Week 02 : Classification of Learning, Intro to non-associative learning, Habituation, Sensitisation Gil withdrawal reflex

Week 03 : Introduction to Classical Conditioning: Associative Learning, Pavlovian Conditioning Factors governing association Contiguity vs Contingency, Negative Contingency, Garcia and Koleings Experiment & Kamin's Blocking

Week 04 : Theories of Conditioning: Rescorla Wagner -1 Development of the Framework