

# NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Computational Neuroscience

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Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Neuron Structure
- Lecture 2 - Networks of Neurons and Synapses
- Lecture 3 - Basic Structures in the Brain
- Lecture 4 - Systems of neural processing
- Lecture 5 - Methods of Recording Neural Activity
- Lecture 6 - Membrane Potential and All or None Spike
- Lecture 7 - Patch Clamp Measurements
- Lecture 8 - Ion channels
- Lecture 9 - Current injection: Synapses
- Lecture 10 - Single Neuron Acitivity
- Lecture 11 - Point and compartmental models of neurons
- Lecture 12 - Hodgkin Huxley Equations - I
- Lecture 13 - Hodgkin Huxley Equations - II
- Lecture 14 - Reducing the HHE and Moris-Lecar Equations (MLE)
- Lecture 15 - Properties of MLE
- Lecture 16 - Phase Plane Analysis - I
- Lecture 17 - Phase Plane Analysis - II
- Lecture 18 - Phase Plane Analysis - III
- Lecture 19 - Analysing HHE with Phase Plane Analysis - I
- Lecture 20 - Analysing HHE with Phase Plane Analysis - II
- Lecture 21 - Random variables and random process
- Lecture 22 - Spike train statistics and response measure
- Lecture 23 - Receptive fields and models of receptive fields
- Lecture 24 - Stimulus to Response mapping (Coding) - I
- Lecture 25 - Stimulus to Response mapping (Coding) - II
- Lecture 26 - Stimulus to Response Mapping (Coding) - III
- Lecture 27 - Response to Stimulus Mapping (Decoding)
- Lecture 28 - Basics of Information Theory - I
- Lecture 29 - Basics of Information Theory - II

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- Lecture 30 - Maximally Informative Dimensions
- Lecture 31 - Intro to Discrimination based methods
- Lecture 32 - Kullback Leibler Distance
- Lecture 33 - Measuring Spike Train Distances - I
- Lecture 34 - Measuring Spike Train Distances - II
- Lecture 35 - Signal and Noise Correlations
- Lecture 36 - Statistical Methods in Discrimination
- Lecture 37 - Single Cell Decoding - I: Two Alternative Forced Choice task in Monkeys
- Lecture 38 - Single Cell Decoding - II: Using ROC Curves for discrimination
- Lecture 39 - Single Cell Encoding - I: Operant Conditioning Task in Ferrets
- Lecture 40 - Single Cell Encoding - II: Learning in avoidance and approach methods in Ferrets
- Lecture 41 - Plasticity - Synaptic Transmission and Synaptic Strength
- Lecture 42 - Ways of modification of Synaptic Strength
- Lecture 43 - Type of Plasticity
- Lecture 44 - Short Term Plasticity - I
- Lecture 45 - Short Term Plasticity - II
- Lecture 46 - Long Term Plasticity
- Lecture 47 - Spike Time Dependent Plasticity
- Lecture 48 - Hebbian Plasticity
- Lecture 49 - BCM Rule
- Lecture 50 - Synaptic Normalization
- Lecture 51 - Adaptation
- Lecture 52 - Models of Short Term Plasticity
- Lecture 53 - Attention - I
- Lecture 54 - Attention - II
- Lecture 55 - Developmental Cicuits
- Lecture 56 - Optimal Coding in Visual System
- Lecture 57 - Optimal Coding in Auditory System
- Lecture 58 - Optimal Coding of Deviant Stimuli in Development
- Lecture 59 - Spike Timing Dependent Plasticity - a theoretical Perspective
- Lecture 60 - Important Problems in Neuroscience