

Course Name - Introductory Neuroscience & Neuro-Instrumentation

Faculty Name - Prof. Mahesh Jayachandra

Institute Name - IISc Bangalore

Course Syllabus -

Week 1: Introduction to Neurophysiology, Basic Operation of Human Brain

Week 2: EEG introduction, EEG recording systems, Understanding EEG waveforms, Applications of EEG analysis

Week 3: Epilepsy a classic Neurophysiological disorder, Types of Epilepsy, Role of EEG Signal Processing for Epilepsy Classification/ Screening

Week 4: Signal Conditioning for EEG and ECG signal processing with demonstration of ECG signal processing circuits

Week 5: Cortical Auditory Event Potential (CAEP), Different Event Related Potentials and their applications: MMN and P300.

Week 6: EEGLAB and ERPLAB Signal Processing Demo using MATLAB

Week 7: Brain Computer Interface: Introduction, Applications, Existing BCI Sensors

Week 8: Electrophysiology Techniques for BCI: Technologies of BCI kits, Recording Brain Waves In humans and animals, ?Touching? Infrared, Epidermal Electrodes

Week 9: Completing the BCI Loop in Humans without Neurosurgery: Designing Magnetic stimulators

Week 10: Invasive Techniques to acquire neurological signals, Types of implants and signal conditioning systems

Week 11: Tetrodes Fabrication, Microneedle Fabrication, Implanting Tetrodes and microneedles on a rat model

Week 12: Design and Fabrication of Closed Loop Rat Training System, Signal acquisition and post-processing