EC411: Bio-Medical Signal Processing

Details of course:-

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Bio-Medical Signal Processing	3	0	2	NIL

Course Objective:To familiarize students with the fundamental principles and concepts of biomedical signal processing

Course Outcomes:

CO1: Understand the Sources, Types & Characteristics of Different Noises and Artifacts Present in Biomedical Signals.

CO2: Design Time Domain and Frequency Domain Filters for Noise and Artifact Removal from Biomedical signals.

CO3: Apply Various Methods for Analyzing Biomedical Signal Characteristics.

CO4: Explore Alternative Techniques of Analyzing Biomedical Signals in Time and Frequency Domain.

S. No.	Content	Contact Hours
Unit 1	Introduction to Biomedical Signals Action Potential and Its Generation, Origin and Waveform Characteristics of fundamental Biomedical Signals Like:Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG), Phonocardiogram (PCG),Electroneurogram (ENG), Event-Related Potentials (ERPS), Electrogastrogram (EGG)	10
Unit 2	Removal of Noise and Artifacts from Biomedical Signal Random and Structured Noise, Physiological Interference, Stationary and Nonstationary Processes, Noises andArtifacts Present in ECG, Time and Frequency Domain Filtering. Basics of signal averaging, signal averaging as a digital filter, a typical average, software for signal averaging, limitations of signal averaging.	8

Get all syllabi at dtuelectives.in

Unit 3	ECG Signal Processing: Detection of P, Q, R, S and TWaves in ECG, EEG Rhythms, Waves and Transients, Detection of Waves and Transients, Correlation Analysis and Coherence Analysis of EEG Channels.	8
Unit 4	EEG Signal Processing and Event Detection in Biomedical SignalsEEG Signal and Its Characteristics, EEG Analysis, Linear Prediction Theory, Autoregressive Method, Sleep EEG,Application of Adaptive Filter for Noise Cancellation in ECG and EEG Signals;	8
Unit 5	Analysis of Nonstationary Signals Heart Sounds and Murmurs, Characterization of Nonstationary Signals and Dynamic Systems, Short-TimeFourier Transform, Considerations in Short-Time Analysis and Adaptive Segmentation.	8
	Total	42

Books:-

S. No	Books
1	Handbook Of Biomedical Instrumentation by Khandpur, R.S.; Tata McGraw Hill Publishers. 2003
2	*Rangayyan, R.M., 2015. Biomedical signal analysis (Vol. 33). John Wiley & Sons.*
3	*Tompkins, W.J., 1993. Biomedical digital signal processing. Editorial Prentice Hall.*
4	*Medical Instrumentation: Application and Design by John G. Webster*

Get all syllabi at dtuelectives.in↗