BIOMETICAL SIGNAL PROCESSING

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TYPE OF COURSE : Rerun | Elective | UG/PG
COURSE DURATION : 12 weeks (18 Jan’ 21 - 09 Apr’ 21)
EXAM DATE : 24 Apr 2021

PRE-REQUISITES : Signals and Systems, Familiarity with the basic definition of probability, Familiarity with MATLAB

INTENDED AUDIENCE : Electronics, Electrical, Instrumentation
INDUSTRIES APPLICABLE TO : Philips Research, GE Global Research, Siemens Research, TCS, Wipro, Conduent Labs India

COURSE OUTLINE :
This course is prepared for the engineering students in their final year of undergraduate studies or in their graduate studies. Electrical Engineering students with a good background in Signals and Systems are prepared to take this course. Students in other engineering disciplines, or in computer science, mathematics, geo physics or physics should also be able to follow this course. While a course in Digital Signal Processing would be useful, it is not necessary for a capable student. The course has followed problem solving approach as engineers are known as problem solvers. The entire course is presented in the form of series of problems and solutions.

ABOUT INSTRUCTOR :
Prof. Sudipta Mukhopadhyay is a graduate from JU (1988), MTech (1991) and PhD (1996) from IIT Kanpur. After serving a decade in industry, serving the Department of Electronics and Electrical Communication Engineering for more than a decade. The last two companies served are Philips medical Systems and GE Global Research, Bangalore. Written more than 100 articles in referred journals and international conferences. Guided more than 81 MTech and 10 PhD scholars.

COURSE PLAN :

Week 1: Preliminaries, Biomedical signal origin & dynamics (ECG), Biomedical signal origin & dynamics (EEG, EMG etc.)
Week 2: Filtering for Removal of artifacts
Week 3: Filtering for Removal of artifacts contd.
Week 4: Event Detection
Week 5: Waveform Analysis
Week 6: Waveform Analysis contd
Week 7: Frequency-domain Analysis
Week 8: Modelling of Biomedical Systems
Week 9: Modelling of Biomedical Systems & Tutorials
Week 10: Tutorials: Design derivative-based filter
Week 11: Tutorials: Use cross-correlation to detect alpha rhythm
Week 12: Tutorials: Derive the Envelogram