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| **Course** | ECE 50600 – Biomedical Instrumentation Design |
| **Type of Course** | Graduate Level Course, can be Technical Elective for EE/CmpE |
| **Catalog Description** | This course covers engineering aspects of detection, acquisition and processing of physiological signals. It integrates sensors, measurement and digital signal processing with applications. Microcontrollers are used for common biomedical instrumentation design and implementation. The analog and digital electronics, analog to digital and digital to analog conversion, and interfacing with computers via microcontrollers are emphasized. |
| **Credits** | 3 |
| **Contact Hours** | 3 |
| **Prerequisite Courses** | ECE 20200, ECE 22900, |
| **Corequisite Courses** | Digital Signal Processing |
| **Prerequisites by Topics** | Circuits and Electronics or equivalent  Analog and Digital Signal Processing  Programming in C |
| **Textbook** | *A. G. Webb, “Principles of Biomedical Instrumentation”, 1st edition* |
| **Course Objectives** | By the end of the course each student should be able to   * Analyze and design biological and medical instruments using microcontrollers * Understand the origin of biosignals from various sources * Acquire physiological signals for analysis with microcontrollers or computers * Understand biosensor and electrode design and apply them for signal acquisition |
| **Lecture Topics** | * Biomedical instrument concepts, classification and design * Safety and regulation of biomedical instrumentation and device * Sensors, transducers and their applications * Signal filtering and amplification * Data acquisition and signal processing * Measurement of flow, volume and pressure of blood * Bio-potentials, ECG, EEG * Wearable Device |
| **Computer Usage** | High |
| **Laboratory Experience** | Median |
| **Design Experience** | High |
| **Coordinator** | Bin Chen, Ph.D. |
| **Date** | 11/14/2022 |