Course Syllabus

ภาควิชา : วิศวกรรมไฟฟ้า ชื่อวิชา : Biomedical Electronics

Prerequisite: Consent of the Department

Textbooks: None

Recommendation Reading:

1. L. A. Geddes and L. E. Baker, "Principles of Applied Biomedical Instrumentation", 3rd Edition, John Wiley and Sons, 1989.

- 2. J. J. Carr, "Designer's Handbook of Instrumentation and Control Circuits", Academic Press, 1991.
- 3. J. D. Bronzino, "The Biomedical Engineering Handbook", CRC/IEEE Press, 1995.
- 4. IEEE Transactions on Biomedical Engineering, IEEE Engineering in Medicine and Biology Magazine, Medical & Biological Engineering & computing, Journal of Medical Engineering & Technology, and Proceedings of the IEEE.

Objective:

- 1. To provide fundamental concepts used in designing biomedical related electronic circuits.
- 2. To give a fundamental knowledge on electronic applications in biomedical engineering.

Examination:

1.	Midterm Test	40 %
2.	Final Test	40 %
3.	Attention and Assignment	20 %

Language of Lecture : Thai

Language of Examination: English

Course Description:

แหล่งกำเนิดและลักษณะสัญญาณจากสิ่งมีชีวิต เทคนิคการวัดและเครื่องมือที่ใช้ การออกแบบเครื่องมือ การแปลงรูปสัญญาณ

Sources and characteristics of biomedical signals, measurement techniques and equipments, instrument design, signal conversion

Introduction		Topics	Hours
* Scope of this course 2 Sources of Biomedical Signals * EMG * ECG * PCG * PCG * EEG 3 Biosensors * Electrodes * Physiological transducers * Piezoelectric devices 4 Filters * Analog, passive and active filters * Digital Filters 5 Amplifiers * Operational Amplifiers (OA) * Operational Transconductance Amplifiers (OTA) * Current Difference Amplifiers (CDA) * Instrumentation Amplifiers (IA) * Isolation Amplifiers 6 Data Converters * ADC * DAC 7 Biomedical Signals Processing * Signal acquisition * Signal processing 8 Biomedical Image Acquisition and Analysis * Biomedical Images * Image acquisition * Image processing 9 Electrical Safety 4 10 Design Case Studies 6	1	Introduction	2
Sources of Biomedical Signals		 * What is Biomedical Engineering 	
* EMG * ECG * PCG * EEG 3 Biosensors * Electrodes * Physiological transducers * Prizoelectric devices 4 * Filters * Analog, passive and active filters * Digital Filters 5 * Amplifiers * Operational Amplifiers (OA) * Operational Transconductance Amplifiers (OTA) * Current Difference Amplifiera (CDA) * Instrumentation Amplifiers (IA) * Isolation Amplifiers 6 Data Converters * ADC * DAC 7 Biomedical Signals Processing * Signal acquisition * Signal processing 8 Biomedical Image Acquisition and Analysis * Biomedical Images * Image acquisition * Image processing 9 Electrical Safety 4 10 Design Case Studies 6			
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