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

		Topics	Hours
1		**Introduction**	2
	∗	What is Biomedical Engineering	
	∗	Scope of this course	
2		**Sources of Biomedical Signals**	4
	∗	EMG	
	∗	ECG	
	∗	PCG	
	∗	EEG	
3		**Biosensors**	6
	∗	Electrodes	
	∗	Physiological transducers	
	∗	Piezoelectric devices	
4		**Filters**	4
	∗	Analog, passive and active filters	
	∗	Digital Filters	
5		Amplifiers	6
	∗	Operational Amplifiers (OA)	
	∗	Operational Transconductance Amplifiers (OTA)	
	∗	Current Difference Amplifiera (CDA)	
	∗	Instrumentation Amplifiers (IA)	
	∗	Isolation Amplifiers	
6		Data Converters	4
	∗	ADC	
	∗	DAC	
7		Biomedical Signals Processing	6
	∗	Signal acquisition	
	∗	Signal processing	
8		Biomedical Image Acquisition and Analysis	6
	∗	Biomedical Images	
	∗	Image acquisition	
	∗	Image processing	
9		Electrical Safety	4
10		Design Case Studies	6
		Total	48