

Biomedical Sensor & Signal Processing: Spring 2010

Time and Location:

Wednesday PM 9:10~12:00 @ F3010

Instructor:

莊子肇, Assistant Prof.

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Office hour by appointment

Prerequisites:

電子學、信號與系統

Textbooks/References: 請遵守智慧財產權觀念，不可非法影印

“VLSI Circuit for Biomedical applications”, Krzysztof Iniewski, Artech House Publishers 2008

“Design and Development of Medical Electronic Instrumentation”, D. Prutchi and M. Norris, Wiley-Interscience 2004

“Signals and Systems Analysis in Biomedical Engineering”, Robert B. Northrop, CRC Press 2003

“Medical Instrumentation: Application and Design”, John G. Webster, Wiley 2009 (4th edition)

※以書國內由「偉明圖書公司」代理 02-23638586※

Schedule:

2/24	Introduction
3/3	Bioelectric phenomenon
3/10	The origins of biopotential (LAB1: EMG measurement)
3/17	The origins of biopotential (LAB2: ECG measurement)
3/24	The origins of biopotential (LAB3: EEG measurement)
3/31	Biomedical sensor

4/7	Biopotential amplifiers
4/14	Biomedical instrumentation and safety
4/21	Medical parameters in circulatory system (LAB4: H _b O ₂ measurement)
4/28	Medical parameters in respiratory system
5/5	Midterm (ISMRRM @ Stockholm, Sweden)
5/12	Integrated circuit for neural interfacing (LAB4: H _b O ₂ measurement)
5/19	Integrated circuit for neural interfacing
5/26	Introduction to biomedical signals and systems (LAB5: ECG analysis)
6/2	Time-frequency analysis of biomedical signals
6/9	Signal and noise
6/16	停課 (端午節)
6/23	Project Report

Labs:

3/15~3/19	LAB1: EMG measurement (2 hrs)
3/22~3/26	LAB2: ECG measurement (2 hrs)
4/6~4/9	LAB3: EEG measurement (2 hrs)
4/19~4/23	LAB4: blood oxygenation level measurement (2 hrs)
5/17~5/28	LAB5: ECG circuit
5/31~6/11	LAB6: analysis of ECG

Grading:

Lab	60%
Midterm	20%
Project	20%

Week 1	Introduction
Week 2-3	The origins of biopotentials (EMG, ECG, EEG, MEG)
Week 4-5	Biomedical sensors
Week 6	Biosignal amplifiers
Week 7	Biosignal processing
Week 8	Biomedical instrumentation and safety
Week 9	Midterm
Week 10	Blood pressure and sound
Week 11	Flow and volume of blood
Week 12	Respiratory system
Week 13-16	Biomedical Imaging (X-ray, CT, PET, Ultrasound, MRI)
Week 17	Biomedical optics and lasers
Week 18	Final