

BME362 Biomedical Instrumentation Design (3 cr.) MWF12:00-12:50, Beaupre 105, Spring 2017

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wk	date	lecture topics	Reference
1	1/23 1/25 1/27	introduction to biomedical instrumentation design basic electronics: diodes transistors	I-Ch. II
2	1/30 2/1 2/3	i-v characteristics and bias of transistors transistor circuits noninvasive measurement of arterial oxygen saturation	II handout
3	2/6 2/8 2/10	pulse oximetry, photoplethysmogram (PPG) circuit applications of PPG electrical safety: current levels for various electrical hazards	handout I-Ch. 14
4	2/13 2/15 2/17	fuse, circuit breaker, ground fault circuit interrupt (GFCI) FDA regulations on medical devices CITI training, IRB, IDE, 510k, PMA	handout handout handout
5	2/20 2/22 2/24	(no class, President's Day) Engineering standards, IEC 60601 Medical electrical equipment AAMI EC11 and other standard examples, CITI certificate due	handout handout
6	2/27 3/1 3/3	Exam #1 review of electrocardiogram (ECG) and ECG amplifier amplifiers for biopotentials	I-Ch. 3 I-Ch. 6
7	3/6 3/8 3/10	design with embedded and handheld systems introduction to Android Studio IDE and SDK tools Java programming for Android devices	handout handout handout
8	3/13-17	(no class, spring break)	
9	3/20 3/22 3/24	performance evaluation of QRS detection receiver operating characteristic (ROC) analysis false positive and false negative, sensitivity and specificity	handout handout
10	3/27 3/29 3/31	Introduction to data communication using packet switching TCP/IP and Bluetooth protocols (no class. Dr. Sun attends the NEBEC at NJIT.)	handout handout
11	4/3 4/5 4/7	Exam #2 flow measurement: electromagnetic flow probe, ultrasonic flow probe mean flow measurement by indicator dilution method	handout handout
12	4/10 4/12 4/14	Fick principle for measuring cardiac output cardiac pacemakers, biventricular pacing, cardioverter defibrillator left ventricular assist device (LVAD), artificial heart	handout
13	4/17 4/19 4/21	neuronal action potentials and ionic currents voltage clamp, current clamp, dynamic clamp, & patch clamp the Universal Clamp project	handout handout
14	4/24 4/26 4/28	DNA sequencing technologies microarray technologies microfluidic systems, polydimethylsiloxane (PDMS) devices	handout handout handout
15	5/1	biochips for point-of-care diagnostics, conclusions	handout
16	5/11	Thursday 11:30 am – 1:00 pm Final Exam	

Grading: Exam #1 (24%), Exam # 2 (24%), Final Exam(24%), CITI (4%), Report (24%).

Text books (recommended): I. Medical Instrumentation: Application and Design, 4th edition, edited by J. G. Webster, New York: John Wiley & Sons, 2009. II. Diodes and Transistors - University of California, Berkeley, Dept. EECS, 2007.