Course Description: Application of engineering principles to solving problems encountered in medicine and biomedical research. Topics include transducer principles, electrophysiology, and cardiopulmonary measurement systems. EE 7340 students are required to perform a research project.

Time and Place: MWF 2:00-2:50, 224 Caruth Hall

Instructor: Carlos E. Davila, 328e Caruth Hall
Office Hours WF 3:00-5:00, TTH 1:00-2:00
Phone (214) 768-3197

Text: J.G. Webster, Medical Instrumentation: Application and Design, Houghton Mifflin, 1992

Topics:
I. Introduction: A. History of Biomedical Engineering B. Definition of Biomedical Engineering C. General Instrumentation System D. Generalized Static and Dynamic Characteristics


IV. Biopotential Electrodes: A. The Electrode-Electrolyte Interface B. Polarization C. Polarizable and Nonpolarizable Electrodes D. Motion Artifact E. Types of Recording Electrodes

V. Electrophysiology Instrumentation: A. Basic Op Amp amplifier types B. Instrumentation Amplifiers C. Filters D. Electrical Safety Issues

VI. Cardiopulmonary Support: A. Cardiac Pacing B. Cardiac Defibrillators C. Respirators D. Anesthesia Machines E. Heart-lung Machines

VII. Blood Pressure and Sound Measurement: A. Direct BP Measurements B. Recording System Characteristics C. Heart Sounds and Phonocardiography D. Cardiac Catheterization E. Indirect BP Measurements


IX. Respiratory System Measurements (Spirometry): A. Volumes B. Pressure C. Flow

X. Medical Imaging Systems: A. Radiography B. Tomography C. Ultrasonography Imaging
Grading (EE 5340): Midterm Exam 35%
Final Exam 35%
Laboratory Experiments 30%
Extra Credit Project 10%

Grading (EE 7340): Midterm Exam 35%
Final Exam 35%
Laboratory Experiments 20%
Research Project 10%

SMU Incomplete Grades Policy

An Incomplete (I) may be given if the majority of the course requirements have been completed with passing grades but for some justifiable reason, acceptable to the instructor, the student has been unable to complete the full requirements of the course. Before an (I) is given, the instructor should stipulate, in writing, to the student the requirements and completion date that are to be met and the grade that will be given if the requirements are not met by the completion date. The maximum period of time allowed to clear the Incomplete grade is 12 months (except for graduate thesis and dissertation courses). If the Incomplete grade is not cleared by the date set by the instructor or by the end of the 12-month deadline, the (I) may be changed to an F or to another grade specified by the instructor. The grade of (I) is not given in lieu of an F, WP, or other grade, each of which is prescribed for other specific circumstances. If the student’s work is incomplete and the quality has not been passing, an F will be given. The grade of (I) does not authorize the student to attend the course during a later semester. Graduation candidates must clear all Incompletes prior to the deadline in the official University Calendar, which may allow less time than 12 months. Failure to do so can result in removal from the degree candidacy list and/or conversion of the (I) to the grade indicated by the instructor at the time the (I) was given.

Statement Regarding Disability

Disability Accommodations: If you need academic accommodations for a disability, you must first contact Ms. Rebecca Marin, Coordinator, Services for Students with Disabilities (214-768-4563), to verify the disability and to establish eligibility for accommodations. Then you should schedule an appointment with the professor to make appropriate arrangements.