ENGR 384 - Bioengineering Instrumentation
Walla Walla University - School of Engineering
Winter 2021

Professor:	Larry Aamodt, PhD, PE
Office:	CSP-265 (Engineering office area)
Phone:	(509) 527-2058 office (509) 529-8264 home (home # is best)
e-mail:	larry.aamodt@wallawalla.edu
class webpg:	people.wallawalla.edu/~larry.aamodt/engr384

Textbook: (required)	Medical Instrumentation, Application and Design, 5ed by John G. Webster, Editor, Wiley 2020
Prerequisites:	ENGR 228 Circuit Analysis, and BIOL-142 General Biology
Meeting time	Lecture at 9am MWF will typically be on-line using Teams but may at times meet in-person. Lab is Thursday 2pm to 5pm and meets in CSP-316, the Digital Lab.
General	While this class has an emphasis on examples of biomedical instrumentation, the instrumentation fundamentals are applicable to a wide range of applications within bioengineering.
Bulletin:	Introductory course in biomedical application of instrumentation. Topics include transducers, signal conditioning, electrodes and electrochemistry, ultrasound systems, electrical safety.
Objectives:	- Analyze and interpret data from physical systems with an emphasis on biomedical applications. - Understand basic sensing mechanisms and sensors for physical, chemical, and electrical properties such as displacement, temperature, strain, pressure, fluid flow, and biopotentials. - Understand typical modern instrumentation systems that sense, amplify, digitize and then analyze signals of various types. - Understand electrical hazards and how to eliminate danger for patients and practitioners.
Handouts:	Handouts may be given and unless stated otherwise, **you are expected to treat handouts as a textbook, i.e. read and understand them.**
Class notes:	Material may be presented in lecture that is not in the handouts. Take notes. This material is fair game for tests.
Homework:	Homework is due at the start of class on the day it is due. Homework turned in after class starts will loose 10%. Late work should be avoided, but if submitted will be reduced an additional 10% per day after the day it was due. Hand written solutions are to be neatly printed on engineering paper using standard engineering format (see problem solution format handout). A ruler and/or a template should be used when drawing diagrams or schematics by hand. s

Your work: I expect everything you turn in for grading to be your work and represent your understanding of the material. Homework, labs, or tests that include work that is not your own will receive a score of zero. The only exception is a group or team assignment. At the instructors discretion, cheating will be rewarded with an F as the final grade for the class.

(your work continued) Recognizing that a cooperative study session may enhance understanding, here is my expectation. In general, sharing ideas and strategies verbally will be acceptable in the context of a study group but sharing written work is not. Validating your answers with the group after all members of the group have successfully completed a problem may be acceptable. A rule of thumb is that you need to be responsible for your own work meaning that you understand what you did, you could reproduce it on your own if asked, and you did not copy the solution work from someone else or a solution manual.

Lab Book: You will need a lab notebook. It does not need to have carbon pages but should be "bound". I accept spiral notebooks as bound. It may be helpful if the book is large enough to tape/past in full size 8.5x11" printouts.

Grade composition: Homework, quizzes, in-class participation/presentations - 20%
Labs - 30%
Midterm - 25%
Final - 25%
The instructor reserves the right to shift this distribution to best serve the needs of the class. Scoring generally follows 90,80,70,60% for A,B,C,D but scores may be curved when needed.

Missed exams will receive a score of zero and cannot be made up. (Contact me prior to test time if illness prevents attendance)

Help: Out of class help from the instructor is available for those who attend class and thoroughly read the text and handouts (translation: please attend class regularly). If you have questions please come by my office, send email, or call me at the office or home (note the phone numbers at the top of the syllabus). I'm eager to help you but can only do so if you contact me.

Web Sites: I have a faculty web page for this class, found at people.wallawalla.edu/~larry.aamodt/engr384, that I will use for posting information. Homework assignments will be posted there as well as reference material or links to additional reference material. Occasionally an assignment or lab needs clarification after it is handed out. Check the web page to see if additional information or changes have been posted. D2L will be used for homework and lab report submissions.

Special needs: Students who have disabilities and desire special accommodation must determine the required accommodation in consultation with Disability Support Services (527-2366) and must also inform the instructor of this class.

Walla Walla University (WWU) - Seventh Day Adventist Higher Education

WWU Integrity policy:

www.wallawalla.edu/academics/academic-administration/academic-policies/academic-integrity-policy/

WWU Emergency information

WWU is committed to having a safe campus. Emergency information is at:
www.wallawalla.edu/campus-life/student-life/campus-security

WWU Disability accomodations

In addition to the phone number 527-2366, see:
www.wallawalla.edu/?id=4318

WWU Title IX sex discrimination and sexual misconduct policy

WWU prohibits all forms of sex discrimination and sexual misconduct including, but not limited to, sex-based intimidation and harassment, sexual harassment, domestic violence, dating violence, stalking and sexual violence. If you have been subjected to, or are aware of, an instance of sex discrimination or sexual misconduct, you are highly encouraged to report it to the Title IX coordinator, through the Title IX webpage, or by calling (509) 527-2141. The University has resources to help.

Title IX coordinator email address: jennifer.carpenter@wallawalla.edu

Title IX web page: www.wallawalla.edu/resources/human-resources-payroll/titleix/

Relationship of this class to the WWU core themes

Excellence in Thought

This class helps students develop ability to analyze and perform design that requires excellence in thought.

Generosity in Service

Course content does not directly address generosity in service although as an engineering professional there are opportunities to contribute professional service to the community.

Beauty in Expression

There is beauty in skillfully designed experiments and carefully crafted documentation that is clear, concise, and complete. Such is required in this class.

Faith in God

A life with inner peace comes through faith in God.