

Imperial Valley College
COURSE SYLLABUS FOR:
DIGITAL INSTRUMENTATION
3.0 Credit Units. ELTR220

Ricardo Jimenez, M. Sc.

Course Description:

This course covers advanced concepts in op-amps, and digital instrumentation circuits. An emphasis will be made on digital instrumentation circuits, and interfaces using transducers and analog to digital converters.

Course Goals And Objectives:

Upon successful completion of this course, the student will be able to:

1. Analyze and interpret circuits with op-amps.
2. Explain the operation of op-amps in different configurations.
3. Apply transducers in op-amps circuits.
4. Compare and contrast the newer solid state devices, such as sensors and transducers.
5. Apply digital design instrumentation techniques to various measurements situations.
6. Construct various system designs and interfacing arrangements.
7. Compare hybrid systems based on time and frequency.
8. Construct and set up a Smart-Home Instrumentation Panel
9. Apply A/D and D/A converters in instrumentation circuits.
10. Analyze the new devices and systems proposed by authors in journals and trade magazines, and appraise the value of these advances for redesign of systems.

Class Hours:

M--F (Lecture/Lab) 8:00-11:50 am, Room: 3110.

Detail Course Schedule:

1. Sensors and transducers
2. Analog to Digital converters
3. Introduction to Operational Amplifiers (Op-Amps)
4. Basic Applications of Op-Amps
5. Volume, Pressure, and Flow Transducers
6. Integrators, Differentiators, and filters with Op-Amps
7. Instrumentation Circuits using Microcontrollers
8. Mid Term Exam
9. Sensors for Smart-home Panels
10. Smart Home Panels
11. Analysis of redesigned systems using LabVIEW
12. Review for Final Exam
13. Final Examination

Discussion Of Assignments And Instructional Methods:

Discussion of assignments and instructional methods will be a combination of all methods of instruction, which can be classified as telling, lecturing, or discussing; showing or demonstrating.

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Statement Of Grading Procedures:

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| 1. Homework, Assignments: | 10% |
| 2. Lab. Experiments and Reports: | 30% |
| 3. Mid-Term Exam: | 30% |
| 4. Final Exam: | 30% |

Attendance Policy:

Students are expected to attend all sessions of the class for which they are registered. It is the student's responsibility to contact instructors regarding any absence. The acceptance of an excuse for an absence, other than an official leave of absence, is at the discretion of the instructor. Students whose continuous, unexcused absences exceed the number of hours a class is scheduled to meet per week (5 hours = one class) may be considered inactive and may be dropped by the instructor. However, there is no responsibility on the part of the instructor to do so.

Textbooks:

Fundamentals of Industrial Instrumentation and Process Control. William C. Dunn.
McGraw-Hill.

Lab Handbook:

The PIC Microcontroller Notebook, Experiments for Instrumentation Applications. Vol III.
Ricardo Jimenez.

Required Materials:

All the materials with the exception of the text book and Handbook will be supplied.

Accommodations For Disabilities:

Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP & S) office as soon as possible.

Policy On Plagiarism And Cheating:

If cheating or plagiarism is discovered, a student may be dropped from the course with a grade of "F".