

### Basic Course Information

Semester:	<b>Fall 2017</b>	Instructor Name:	<b>R. Jimenez</b>
Course Title & #:	<b>DIGITAL INSTRUMENTATION MEASUREMENTS. ELTR120</b>	Email:	ricardo.jimenez@imperial.edu
CRN #:	<b>10802</b>	Webpage (optional):	
Classroom:	<b>3110</b>	Office #:	
Class Dates:	<b>8/14/2017 -12/08/2017</b>	Office Hours:	
Class Days:	<b>M/W</b>	Office Phone #:	
Class Times:	8:00-11:05 A.M./ 9:00-11:10 AM	Emergency Contact:	
Units:	3		

### 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.

### Student Learning Outcomes

1. Familiarize with Sensors and Transducers.
2. Describe the function of Analog to Digital Converters
3. Analyze Op-Amps Circuits in different configurations
4. Construct, test and troubleshoot various instrumentation circuits.

### Course 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 sensors 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. Explain the characteristics of microcontrollers with ADC and DAC functions
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.

## Textbooks & Other Resources or Links

The PIC Microcontroller Engineer's Notebook. R. Jimenez, © 2016. ISBN: 978-0-692-76419-0

Fundamentals of Industrial Instrumentation and process Control. 2nd Edition. William C. Dunn. McGraw-Hill. ISBN: 978-0071457354

Scientific Calculator CASIO fx-117ES or equivalent. All other materials with the exception of the text book and calculator will be supplied.

## Course Requirements and Instructional Methods

Students will be given assignments to build and test each topic on a Protoboard. Each functional circuit will be considered for accumulative points for the Midterm and Final Test.

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

## Course Grading Based on Course Objectives

### Statement Of Grading Procedures:

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

## Attendance

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See [General Catalog](#) for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.

## Classroom Etiquette

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.

- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the [General Catalog](#).
- Children in the classroom: Due to college rules and state laws, no one who is not enrolled in the class may attend, including children.
- Lectures will be audio recorded occasionally for quality purposes.

### Online Netiquette

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.
- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, pejorative and profane language, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

### Academic Honesty

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to "cite a source" correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the [General Catalog](#) for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

## Additional Student Services

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

- [Blackboard Support Site](#). The Blackboard Support Site provides a variety of support channels available to students 24 hours per day.
- [Learning Services](#). There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your [Campus Map](#) for the [Math Lab](#); [Reading, Writing & Language Labs](#); and the [Study Skills Center](#).
- [Library Services](#). There is more to our library than just books. You have access to tutors in the [Study Skills Center](#), study rooms for small groups, and online access to a wealth of resources.

## Disabled Student Programs and Services (DSPS)

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. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

## Student Counseling and Health Services

Students have counseling and health services available, provided by the pre-paid Student Health Fee.

- [Student Health Center](#). A Student Health Nurse is available on campus. In addition, Pioneers Memorial Healthcare District provide basic health services for students, such as first aid and care for minor illnesses. Contact the IVC [Student Health Center](#) at 760-355-6128 in Room 1536 for more information.
- [Mental Health Counseling Services](#). Short-term individual, couples, family, and group therapy are provided to currently enrolled students. Contact the IVC [Mental Health Counseling Services](#) at 760-355-6196 in Room 2109 for more information.

## Student Rights and Responsibilities

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC [General Catalog](#).

## Information Literacy

Imperial Valley College is dedicated to helping students skillfully discover, evaluate, and use information from all sources. The IVC [Library Department](#) provides numerous [Information Literacy Tutorials](#) to assist students in this endeavor.

<b>Anticipated Class Schedule/Calendar</b>		
<b>Date or Week</b>	<b>Activity, Assignment, and/or Topic</b>	<b>Pages/ Due Dates/Tests</b>
Week 1 August 14 - 18	Syllabus & Introduction Introduction to Sensors and Transducers	
Week 2 August 21 - 25	Analog to Digital Converters	
Week 3 August 28-Sept-01	Introduction to Operational Amplifiers (Op-Amps)	
Week 4 Sept 4-8	Basic Applications of Op-Amps	
Week 5 Sept 11-15	Amplifiers and Oscillators	
Week 6 Sept 18-22	Integrators, Differentiators and Filters with Op-Amps	
Week 7 <b>Sept 25-29</b>	Instrumentation Circuits for signal conditioning applications	
Week 8 Oct 2-6	Midterm Review and Exam.	
Week 9 Oct 11-13	Oscillators and interface arrangements	
Week 10 Oct 15-19	Analysis of redesigned systems	
Week 11 Oct 23-27	Instrumentation Circuits for analog signals	
Week 12 Oct 30-Nov 3	Instrumentation Circuits for digital signals	
Week 13 Nov 6-Nov 10	Pulse Circuits in instrumentation applications	
Week 14 Nov 14-18	Instrumentation applications with embedded processors	
Week 15 Nov 20-24	Troubleshooting instrumentation circuits	
Week 16 Nov 27-Dec 1	Review of topics for Final Exam.	
Week 17 Dec 4-8	Final Exam	