Sonoma State University
School of Science and Technology
Electrical Engineering Program
EE 381 - Introduction to Instrumentation and Automation Laboratory
Spring 2019

Instructor Contact Information

Name: Dr. Farid Farahmand
Office Location: Salazar 2004
Office Telephone Number: 707-664-4691
Email: farid.farahmand@Sonoma.edu
Office Hours: http://web.sonoma.edu/engineering/resources/faculty_office_hours.html

General Course Information

Class Days/Time: Thursdays 1:00-3:50 PM
Classroom: Salazar 2006
Credit Hours: 1.0
Pre-requisite: ~~EE 330 and~~ CS 115, or consent of instructor
Co-requisite: None

Course Description

EE 381: Introduction to Instrumentation and Automation Laboratory (1 unit). Laboratory: 3 hours. In this laboratory based course students are introduced to computerized data acquisition systems and interfacing methods to laboratory instruments. Topics include building virtual instruments, understanding data acquisition methods, learning about communication busses, utilizing feedback control systems in automated testing, and performing signal processing and analysis.

Course Format and Instructional Methods

This course will be taught using multiple instructional methods. These methods will include oral presentations, group discussion, and hands-on activities. Typically, course topics will be introduced via a short oral presentation followed by hands-on lab activities. This course will also utilize Canvas, SSU's learning management system, where you will interact with your classmates and with the instructor. Within the course Canvas site you will access the learning materials, discuss issues, submit assignments, participate in online group activities; and share your projects. Refer to the course calendar/schedule and assignment instructions for information on where and when to submit your work.

Student Learning Outcomes

Upon successful completion of this course the students will be able:

- To automate measurements using oscilloscopes, function generators, and other key instruments related to electrical measurements.
- To be able to program using LabVIEW.
- To understand basic communication protocols to communicate with various instruments.

- To build virtual instruments to control laboratory instruments.

Required Texts/Readings

Textbook: All lecture materials will be provided.

Additional materials: Please see the list of parts required for the class on the web site.

Other Equipment/Material Requirements/Software

Please bring a laptop with LABVIEW installed to class. If you do not have access to a laptop, the ES department or SSU Library can provide a loaner for your use this semester. Contact the instructor if you need help with this. Information about hot to get LABVIEW software are provided on Canvas.

Tentative Course Schedule (Changes will be announced in the class and/or on Canvas)

Laboratory Exercises	Week
Introduction to Instrumentations	1
Programing Instruments	2
Introduction to LabVIEW	3
Basic Programming in LabVIEW	4
Advances features in LabVIEW	5
State machines (1)	6
State machines (2)	7
Midterm	8
Feedback systems (1)	9
Feedback systems (2)	10
Signal Processing Methods and Visualization (1)	11
Signal Processing Methods and Visualization (2)	12
Programming protocols	13
Project Presentations	14
Final Lab Exam	15

Attendance

Class attendance is mandatory in this course and students are expected to attend all class meetings and be on time. However, there are legitimate reasons for missing class, such as illness, accidents, death of a close family member, jury duty, religious observance or representing the University at officially approved University activities. Students should be cautioned that even though absences may be for legitimate reasons, such absences can impair performance and result in a lower grade.

When students are absent from classes, it is their responsibility to provide the instructor with due notice and documentation when possible, and to inform the instructor of the reason for absence. Students are also responsible for requesting, in a timely manner, to make up missed assignments and class work if these are reasonably able to be provided.

If you miss one or more classes for legitimate reasons, please make sure you communicate with the instructor as soon as possible to make the appropriate arrangement.

Tardy / Late Arrival

A student will be considered tardy if the student arrives after content instruction or the laboratory activity has begun. On the fourth incident of tardiness, and with all future tardiness, the student will be considered absent. If a student arrives later than 15 minutes after the lecture/lab has begun, the students will be considered absent, but may be allowed to stay and participate in the class.

In-Class Assignments

During each class students are asked to complete and submit simple problems to make sure they have gained sufficient understanding of the topic in order to complete their homework assignments. Therefore, all students are required to be present to complete the in-class assignments. All in-class assignments must be submitted during the class.

Weekly Assignments & Demonstrations

All students are required to complete homework assignments. Homework assignments require familiarity with different software tools such as LabVIEW MS Word, Excel, VISIO, Lucid Chart, or other similar tools. Homework assignments must be submitted via Canvas. All homework assignments are based on the hands-on activities that students perform during the lab. *Assignments will be checked at eh beginning of each class. If the assignment is not available it is considered to be one day late.*

All assignment submissions must have a coversheet, otherwise they will not be accepted. Unless specified in advance, no handwritten homework will be accepted. Use the provided template for all assignments. Each submitted assignment must include the source code and the output results. All students must demonstrate in class that their codes work and produce the correct results. If you cannot demonstrate, no partial credit will be given until the demonstration is complete.

Final Project

You are required to submit one final design project. All projects require an abstract and prior approval from your instructor. The abstract must include group members (who is doing what), project idea, and objective of the project. Maximum of two people per group is allowed. The final design project must be functional and properly operate as intended.

Midterm Project

You are required to submit one midterm design project. Maximum of two people per group is allowed. The final design project must be functional and properly operate as intended.

Late Submissions/Demonstrations

Unless otherwise stated, late submissions will receive 15 deduction points for each late day, including weekends.

Graduate Students

This course is cross-listed with a graduate course. As such all graduate students are expected to turn in multiple projects along with complete report/slide presentations:

Mid-term Projects: select one of the topics and present a demo:

- Create a GUI interface and show how to interface an instrument using Python/Python-VISA.
- Create a GUI interface and show how to interface an instrument using MATLAB.
- Show how to interface an instrument using SCSI commands.
- Implement LabVIEW on Raspberry PI.
- Connect LabVIEW to a robot or (Rumba) wirelessly and control it.

All projects must have an abstract and a project tutorial/presentation.

Course Requirements & Grading Policy:

Weekly Assignments & Demonstrations----------50%
Attendance & In-class Assignments ----------10%
Final Project ----------20%
Midterm Project/Test ----------20%

Course Requirements & Grading Policy for Graduate Students

Weekly Assignments & Demonstrations----------40%
Final Project Demo ----------15%
Final Project Tutorial/Presentation ----------10%
Midterm Project Tutorial/Presentation ----------10%
Midterm Project Abstract ----------05%
Final Project Abstract ----------05%
Midterm Project ----------15%

A	≥ 93.0%	100%
A-	≥ 90.0%	< 93.0%
B+	≥ 87.0%	< 90.0%
B	≥ 83.0%	< 87.0%
B-	≥ 80.0%	< 83.0%
C+	≥ 77.0%	< 80.0%
C	≥ 73.0%	< 77.0%
C-	≥ 70.0%	< 73.0%
D+	≥ 67.0%	< 70.0%
D	≥ 60.0%	< 67.0%
F		< 60.0%

General Information

Canvas

Canvas is SSU's Learning Management System (LMS). Canvas is the place where you will find the course syllabus, read posted announcements in the news forum, participate in online class discussions with classmates, submit your assignments online and view the materials for this course. To access the Canvas course site use your SSU Seawolf ID and password to log into SSU's Online Services Portal https://login.sonoma.edu. Click on the **Canvas** link. You can also access it from https://canvas.sonoma.edu. When you get to the Canvas site home, click on the "**Courses**" menu located on the left navigation. Click on the link for this course (classes are listed by course name and number, click on "All Courses" if this course does not appear on the list). Note: The Login link is also conveniently located at the top of the Sonoma State University homepage http://www.sonoma.edu and many other university pages.

Canvas Help and Student Computing Resources

Canvas and General IT Help Desk

Contact the IT Help Desk http://www.sonoma.edu/it/helpdesk/ if you need assistance with Canvas or other information about computing and information technology at SSU. Three ways to contact the IT Help Desk are:

- Call: 707-664-4357
- Email: helpdesk@sonoma.edu
- Visit Location: Schulz 1000

Plugins

Download Plugins http://www.sonoma.edu/about/plugins.html lists plugins that may be needed to access some content on or linked from SSU websites and Canvas.

General Student Computing

Review the information posted at Student Computing http://www.sonoma.edu/it/students. There you will find computer use guidelines and a list of available computer labs.

Library Research Guides and Subject Librarians

The University Library can help you find information and conduct research. You can make an appointment with a subject librarian, get help online, or drop by the library during open Research Help hours: http://library.sonoma.edu/about/hours/detailed.
(Insert the URL address for the Research Guides http://libguides.sonoma.edu/ provided by your subject librarian, contact information for the Subject Librarians http://library.sonoma.edu/research/subjectlibrarians/, and any applicable Information for distance learners http://library.sonoma.edu/services/distancelearners/.)

University Policies

There are important University policies that you should be aware of, such as the add/drop policy; cheating and plagiarism policy, grade appeal procedures; accommodations for students with

disabilities and the diversity vision statement. See Important Policies and Procedures for Students http://www.sonoma.edu/uaffairs/policies/studentinfo.shtml.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. How to Add a Class http://www.sonoma.edu/registration/addclasses.html has step-by-step instructions. Registration Information http://www.sonoma.edu/registration/regannounce.html lists important deadlines and penalties for adding and dropping classes.

Campus Policy on Disability Access for Students

If you are a student with a disability, and think you may need academic accommodations, please contact Disability Services for Students (DSS), located in Salazar Hall, Room 1049, Voice: (707) 664-2677, TTY/TDD: (707) 664-2958, as early as possible in order to avoid a delay in receiving accommodation services. Use of DSS services, including testing accommodations, requires prior authorization by DSS. See SSU's policy on Disability Access for Students http://www.sonoma.edu/uaffairs/policies/disabilitypolicy.htm.

Emergency Evacuation

If you are a student with a disability and you think you may require assistance evacuating a building in the event of a disaster, you should inform your instructor about the type of assistance you may require. You and your instructor should discuss your specific needs and the type of precautions that should be made in advance of such an event (i.e. assigning a buddy to guide you down the stairway). We encourage you to take advantage of these preventative measures as soon as possible and contact the Disability Services for Students office if other classroom accommodations are needed.

Academic Integrity

Students should be familiar with the University's Cheating and Plagiarism policy http://www.sonoma.edu/UAffairs/policies/cheating_plagiarism.htm. Your own commitment to learning, as evidenced by your enrollment at Sonoma State University and the University's policy, require you to be honest in all your academic course work. Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified.

Additional Resources

SSU Writing Center

The SSU Writing Center, located at Schulz 1103, helps SSU students become better writers and produce better written documents. The knowledgeable and friendly tutors can help you with a wide array of concerns, from generating good ideas and organizing papers more clearly to learning citation formats and using semi-colons correctly. Visit the http://web.sonoma.edu/writingcenter/ for more information.

Counseling and Psychological Services (CAPS)

CAPS is a unit of the division of Student Affairs of Sonoma State University. CAPS offers confidential counseling to students experiencing personal problems that interfere with their academic progress, career or well being. The CAPS website http://www.sonoma.edu/counselingctr provides information only. If you would like to talk with someone or make an appointment, please call (707) 664-2153 between 8 a.m. - 4:30 p.m., Monday-Friday.