Oklahoma State University Institute of Technology
Course Syllabus
Fall 2017

ETDE-3513 Programming for Instrumentation

Introduce students to computer-based data acquisition and process control using graphical programming to automatically measure physical properties encountered in instrumentation engineering technology

Course Purpose:
This course will introduce students to computer-based data acquisition and process control using graphical programming to automatically measure physical properties encountered in instrumentation engineering technology.

Type of course: Theory/Lab.
Credit Hours: 3;
Total hours of theory per semester: 30; Total hours of lab for the semester: 45;
Class length - Full Semester
Class days and times: MWF 08:00- 9:25 AM
Prerequisites: ETDE 3123

Instructor Name: Asif Hoque **Instructor Phone:** (918) 293-5375

Office: ETDE Building -Room 15J **Instructor email:** asif.hoque@okstate.edu

Instructor's Office Hours: Monday, Wednesday, Friday: 3.00 pm to 4.00 pm
Tuesday, Thursday: 10.30 pm to 11.30 pm

Division Name: Engineering Technologies **Division Phone:** (918) 293-5150

REQUIRED TEXT, REFERENCES, AND MATERIALS

Texts: LabVIEW for Everyone: Graphical Programming Made Easy and Fun (3rd Edition) ISBN: **978-0131856721**

References: Hands-On Introduction to LabVIEW for Scientists and Engineers ISBN: 978-0199925155

Materials: Basic class materials, media storage, calculator, MyDAQ.
Uniform/Tools: Digital Multi-meter, ETDE toolkit or equivalent.

Optional Resources: Windows 10 OS Laptop Computer with the following minimum requirements: 8GB RAM (16GB preferred), 1TB Hard drive, Intel i5 CPU (i7 preferred), dedicated graphics card, 1600x900 screen resolution or better, Wi-Fi connectivity, DVD player. (Apple Mac computers are highly discouraged due to software compatibility issues)

Upon completion of this course, students should demonstrate the ability to:

Course Outcomes	Assessment Method
1. Apply the basic methodology of electronic measurements.	Labs, tests
2. Perform basic computer interfacing for measurements and control.	Labs, tests
3. Select a transducer for standard measurements (temperature, flow, pressure, strain, displacement, velocity and acceleration etc.)	Labs
4. Select an electronically controlled actuator.	Labs
5. Apply the process of design of a data acquisition system.	Labs
6. Implement a simple control system.	Labs
7. Present a project via a detailed presentation or creative video.	Presentation/Report
8. Demonstrate the fundamentals of working in a team.	Labs, Project

COURSE ACTIVITIES

In this course students will:

- *Participate in class discussions and activities.*
- *View videos that depict the various concepts.*
- *Contribute to a course Service Learning project.*
- *Participate in group and individual presentations.*
- *Compile a portfolio of work produced.*
- *Take examinations.*
- *Complete reading assignments.*
- *May be required to do quizzes.*

EVALUATION - GRADES WILL BE BASED ON THE QUALITY AND COMPLETION OF THESE TASKS:

The final course grade will be calculated with the following weights:

Unit test	15%
Labs	50%
Lab project Presentations/Report*	15%
Final Test	20%

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Grading Scale

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% & below

*The student's grade for this assignment will be used in the university's assessment of student learning. A 70% competency or higher receives a Pass rating. This Pass/Fail rating is independent of the student's course grade.

Daily and/or weekly quizzes, small weekly assignments and similar type projects: Normal return time to student by next class meeting or no later than one (1) week.

Extensive assignments, large lab projects, extensive quizzes, exams and similar type projects: Normal return time to students in one (1) to two (2) weeks.

RECOMMENDED STUDENT COMPENTENCIES/SKILLS

Arduino Programming skill.

AUTHORIZED TOOLS

Instructors Policy to Submit Work

To provide students with improved feedback, technical documents shall be submitted electronically via D2L unless approval is received for other methods. To ensure students learn to submit documents electronically, students are required to submit work in Microsoft Word format and follow a pre-define template and format. Students will be asked to meet a goal in data recording and analysis by submitted data plots in Microsoft Word format (after creating in a Microsoft Excel or other professional software format) with the aid of team members and instructor advisement. All individual submissions must be submitted as **one** Microsoft Word or PDF document unless instructed otherwise. Documents that are not legible will be given a grade of zero. NO EXCEPTIONS!

LATE WORK

Labs/Project: Submitting your complete and properly-executed work early is always acceptable. Lab report must be submitted in D2L. Lab report should include signed off (Instructor Sign) page. Late work will get 25% penalty.

Unit exam and Final Exam: If you miss an exam, it cannot be made up unless your absence meets the requirements for an approved absence. Make-up exams may be different from the exam given in class and may be more difficult. Unit Exams and Final Exam CANNOT be made up without strict approval and penalty! If you know in advance that you will miss an exam, special arrangements to re-schedule the exam may be possible for hardship circumstances.

TESTING

The following guidelines will be enforced during proctored exams:

- All materials not required for the exam must be placed off the desk
- Scientific/Engineering Calculators are allowed unless otherwise noted
- Once testing has started you are not allowed to leave the room until you have completed the test. Doing so will immediately end the test for you.
- All material associated with the exam must be submitted upon completion.
- All tests will have a defined time for completion.
- Exceptions may be made to these rules at the instructor's discretion.
- Tests will be proctored by the LASSO center on the OSUIT campus.

OTHER LAB AND CLASSROOM POLICIES

The college environment is one in which various ideas, philosophies, and sensitive topics are explored. The open and respectful pursuit of knowledge will require that each person be allowed to share opinions that may not be popular or accepted by all. Language or gestures that are non-inclusive, derogatory, or disrespectful of diverse backgrounds, cultures, ethnicities, religions, genders, and/or sexual orientations will not be tolerated.

- The use of tobacco in any form is not permitted in the building.
- Cell phones must be turned off unless there is a medical need.
- Audio equipment is not permitted.
- Food and beverage is permitted but not around the equipment. Only liquids with screw type closures are allowed.
- Lab computers are to be used for teaching/learning only. Do not use for entertainment or casual internet surfing or chatting. This is especially true during class.
- Students are expected to maintain a respectful manner during class-sleeping or otherwise assuming a laid down position will not be tolerated.
- Tests will not be given early.
- The lab is considered an industrial environment, therefore you must adhere to proper safety and operations protocols. Do not endanger yourself or others.

Dress Code

1. **Shoes must cover entire foot.**
2. **Shorts/Dresses must cover the knees.**
3. **Tank tops/muscle shirts are not to be worn.**
4. **Clothing with obscene logos are not to be worn.**
5. **Clothing that is distracting may not be worn in the classroom setting.**
6. **Clothing that is baggy should not be worn for safety reasons. Jewelry should be removed in the lab setting.**
7. **Safety glasses must be worn when appropriate.**

E-Mail Communication Standards
Students are encouraged to use e-mail when communicating personal issues with their instructor. E-mail corruption is a significant problem and unidentified e-mails are simply purged. Therefore a strict standard is necessary to identify a legitimate student communication. The "message line" of student e-mails must contain in order – Subject, Name, Course, and Trimester. Example: **Missing Assignment, John Smith, ETDE 3513, Spring 2017**.

SYLLABUS ATTACHMENT
View the Syllabus Attachment, which contains other important information, by visiting http://osuit.edu/center/student_syllabus_information

Course Schedule			
Course Outline Schedule	**Topic**	**Assignment**	**Due Date**
Week 1	Introduction to Data Acquisition & LabVIEW		
Week 2	Parallelism, Variables, Functional Global, race conditions.	Lab 1	09/15/17
Week 3	Interface Arduino with LabVIEW	Lab 2	09/22/17
Week 4	Remote access of a LabVIEW process via Wi-Fi.	Lab 3	09/29/17
Week 5	LabVIEW Help Utilities, Correcting Broken VIs		
Week 6	Debugging Techniques, Undefined or Unexpected data	Lab 4	10/13/17
Week 7	Error Checking and Error Handling	Test	10/20/17
Week 8	Relating Data, Managing Resources,	Lab 5	10/27/17
Week 9	Motors and Solenoids.	Lab 6	11/03/17
Week 10	Overview on sensors temperature, pressure and flow.	Lab 7	11/10/17
Week 11	Introduction to MyDAQ and data acquisition.	Lab 8	11/17/17
Week 12	Developing modular applications.	Lab 9	11/27/17
Week 13	Data generation and storage.	Project Demo	12/01/17
Week 14	Developing an acquisition system using Crio.	Final Test	12/13/17
Week 15	Grade Review		

*Schedule is subject to change at instructor discretion.