

# Western New England University

## College of Engineering

ENGR 110 - Data Acquisition and Processing (Section #10) - Spring 2012

TR 8:00 am to 9:20 pm @ Sleith-113

[http://www.nunoalves.com/classes/spring\\_2012\\_engr110](http://www.nunoalves.com/classes/spring_2012_engr110)

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**Instructor:** Prof. Nuno Alves

**Contact Information:** 401-633-4660 or nalves@wne.edu

**Office Hours:** TR 1:00pm to 2:00pm at Sleith-313

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**Pre-requisite:** ENGR 103 or permission of instructor.

**Catalog Description:** This is an introductory course in computer-aided data acquisition and processing. Through a series of laboratory experiences, students will learn the principles necessary to design, implement, and analyze computer-controlled experiments. Industry standard LabVIEW is the learning platform for this course. The methods of assessing student learning in the course are homework assignments, weekly quizzes, laboratory experiments and exams. 2 cr.

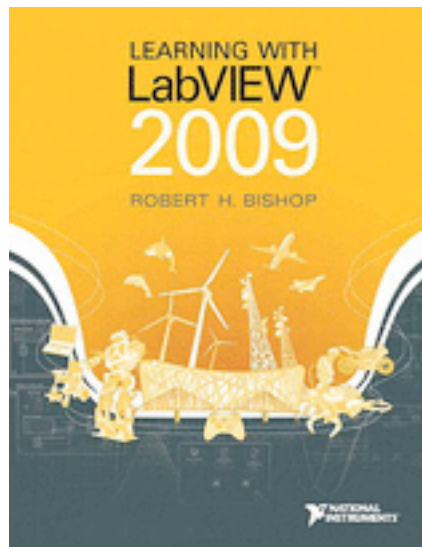
**Course Description:** The learning experiences in this course are to expose all Freshmen engineering students to the techniques engineers use to design and run computer-based experiments that accurately collect and process data which are then used in subsequent design efforts to solve a design problem or meet customer needs. The software that is used in this course to achieve learning objectives is LabVIEW which is designed to access and control test equipment as well as capture and process data received from test equipment. Students will gain knowledge and expertise through laboratory/studio experiences.

**Course Outcomes:** The following are the skills the student should demonstrate upon successfully completing the course.

- Demonstrate an ability to identify what data need to be collected.
- Design an instrument configuration with appropriate software controls to gather that data.

- Verify by appropriate means the validity of the data collected and process the data so that it has the form and content required by the design problem or customer specifications/needs.
- Demonstrate an ability to use Programming Structures (For, While, Case, Sequence, etc).
- Know what Data Types are and how to use them.
- Demonstrate an ability to perform I/O operations.

**Required Material:** [Learning with LabVIEW](#), by Robert H. Bishop, Pearson/Prentice-Hall, National Instruments, NI USB 6008, DAQ with supporting hardware. ISBN: 0132141310



### **Learning Objectives and Assessment:**

- Quizzes – (15% of the total grade) - Expect a quiz a week. This will provide a measure of the student's mastery of the topics presented during the previous week. The lowest quiz will be dropped. No makeup quizzes will be allowed except under extenuating circumstances.
- Projects – (20% of the total grade)
- Homework – (20% of the total grade) - The assignments will involve reading, research, computer exercises and problem solving. Late homework accepted at instructor's discretion. Homework may be reviewed and graded by the audit method (at the instructor's discretion).
- Midterm Exam – (15% of the total grade) – This will be a comprehensive exam.

- Final Exam – (25% of the total grade) – This will be a comprehensive exam.
- Performance Review (5% of the total grade) – The student is expected to attend and participate in two Performance Reviews (with their academic advisor) during the semester. Meeting times will be announced in advance.

**Grading:** The range of numerical grades and the traditional letter equivalents are as follows:

A 93-100	B+ 87-89	C+ 77-79	D+ 67-69	F 0-59
A- 90-92	B 83-86	C 73-76	D 60-66	
	B- 80-82	C- 70-72		

**Attendance Policy:** University policy is that all students are expected to attend all class sessions for courses in which they are enrolled. Students are to attend all activities as no make-ups are scheduled.

**In-progress Grades:** Instructors are required to submit to the registrar in-progress grades. It is crucial that midterm grades report the instructor's actual evaluation of the student's progress. Work accomplished by in-progress grade time will be used to indicate course progress.

**Civility:** As a diverse community of learners, students must strive to work together in a setting of civility, tolerance, and respect for each other and for the instructor. Rules of classroom behavior (which apply to online as well as onsite courses) include but are not limited to the following:

- Respecting and responding to conflicting opinions among members of the class in a civil and professional manner.
- Avoiding side conversations or other distracting behaviors during lectures, class discussions or presentations
- Avoiding disrespectful comments, language, or gestures.

**Integrity of Scholarship (from the WNE catalogue):** Honesty in all academic work is expected of every student. This means giving one's own answers in all class work, quizzes, and examinations without help from any source not approved by the instructor. Written material is to be the student's original composition. Appropriate credit must be given for outside sources from which ideas, language, or quotations are derived. Additional information on academic dishonesty may be found in the Student Handbook and the Academic Integrity Booklet.

**Student Disability Services:** The College of Engineering complies with the American Disabilities Act in making reasonable accommodations for qualified students with disabilities. Students with special needs should make arrangements with the instructor to request accommodations.

**Other information:**

- Changes in syllabus and assignment sheets may be modified as deemed appropriate. All changes will be announced in class.
- Class Cancellation: In the event a class or lab is cancelled due to weather or instructor illness, any work due on the day of the cancelled meeting will be due at the next meeting (class or lab). If a quiz is cancelled due to weather, it will be held at the next scheduled class meeting.
- Students will complete and submit course evaluations forms during the last week of regular classes. Evaluation forms will be distributed, collected, and returned by a student to the office of the College of Engineering.
- The solution of engineering problems requiring work done on paper will use engineering paper; engineering memos and reports will be word processed. All such work will follow the rules of proper engineering format appropriate to the type of information being conveyed.
- Cell phones and pagers must be switched off during class time. Unauthorized web surfing or instant messaging during class time is not permitted.
- Students are expected to check the ENGR 110 Manhattan site on a daily basis for notices, changes to assignments, or other communications. Students are responsible for the information contained in these messages.
- Assignments are due at the start of class on the due date.

**Absences due to religious beliefs:** Any student who is unable because of religious beliefs, to attend class or participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirement, and shall be provided with an opportunity to make up such examination, study or work assignment which he/she may have missed because of such absence on any particular day, provided that such makeup examination or work shall not create unreasonable burden upon such college. It is the responsibility of the student to make arrangements at least one week prior to the date of absence for a makeup assignment.

**Material to be covered:**

- *LabVIEW Basics*: Course goals, Virtual Instrumentation, The LabVIEW Environment, Dataflow Programming, Debugging, Context Help System, Elements of Programming, Displaying Data, Data Structures and Types, VIs and subVIs, Passing information between VIs, Instrument Control.
- *Virtual Instruments*: LabVIEW's programming model, Review the working environment, The Front Panel, The Block Diagram, Building a VI.
- *Editing and Debugging*: Editing Tools, Debugging tools.
- *Structures*: Overview, Programming with Structures.
- *Arrays and Clusters*: Introduction to Arrays, Creating Arrays, Output to arrays, Array subset functions, Auto Indexing Arrays, Polymorphism, Scalar Scalar, Array Scalar, Array Array, Array Functions, Clusters.
- *Charts and Graphs*: Display types, Customizing charts/graphs.
- *Strings and File I/O*: Define a STRING, STRING or TEXT Objects, STRING Display, File Creation, Operations, File Data Types.
- *Data Acquisition and Analysis*: DAQ Background, DAQ Devices and Programming.