Course Syllabus

Department: Science & Technology

Date: 02-02-2015

I. Course Prefix and Number: ESC 174

Course Name: Computing with LabVIEW

Credit Hours and Contact Hours: 2 credit hrs (1 lec hr, 2 lab hrs)
Catalog Description including pre- and co-requisites: supporting data required for grade prerequisite of ‘C’ or higher.
This is a computational course focused on developing and implementing algorithms for monitoring and control of engineering systems using LabVIEW software. Topics covered include: problem solving, data acquisition, instrumentation and control, computer programming concepts, and spreadsheet concepts.
Prerequisite: None.

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable:

This course is primarily a required course for the A.A.S. Instrumentation & Control Technology program. Its main purpose is to familiarize the student with the basic computer programming principles and teach the basics of the software platform LabVIEW. Other students from other programs may also take the course if they would like to learn about the use of this specific software platform and its applications.

II. Course Student Learning Outcomes: State the student learning outcome(s) for the course (e.g. Student will be able to identify...)

Upon completion of the course the student will be able to:

1. Demonstrate the basic principles of computer programming and their application to the solution of engineering problems.
2. Use the LabVIEW computing environment.
3. Write programs in LabVIEW to solve basic engineering problems.

College Learning Outcomes Addressed by the Course: (check each College Learning Outcome addressed by the Student Learning Outcomes)

- [ ] writing
- [ ] oral communications
- [ ] reading
- [x] computer literacy
- [ ] ethics/values
- [ ] citizenship
III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): For each identified outcome checked, please provide the specific assessment measure.

<table>
<thead>
<tr>
<th>List identified College Learning Outcomes(s)</th>
<th>Specific assessment measure(s)</th>
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<tbody>
<tr>
<td>Mathematics</td>
<td>Students will do work in class, as well in homework and quizzes/tests using Excel &amp; LabVIEW to solve mathematical problems.</td>
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<tr>
<td>Critical Thinking</td>
<td>Student will undertake project work to solve a complex problem and demonstrate successful implementation of solution in a presentation to the class.</td>
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<tr>
<td>Computer Literacy</td>
<td>Student will complete several assignments involving flowcharting and implementing solutions using LabVIEW and Excel.</td>
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IV. Instructional Materials and Methods

Types of Course Materials:
Textbook used is “Learning with LabVIEW ” by Robert H. Bishop (The students should get the version of the book with the Software CD, for use of software on personal computer at home.) Software for LabVIEW is provided to students on certain school computers.

Methods of Instruction (e.g. Lecture, Lab, Seminar ...):
The instruction is done in a traditional lecture format as well as in the form of coaching student groups through their various assignments and projects. Small class sizes allow instructor to engage the students on a one-on-one basis. Hands-on approach is emphasized throughout the course. Students continually use the computers during instruction times. Team work among the students are encouraged and under certain circumstances required.

V. General Outline of Topics Covered:
Flow Charts algorithm for solving problems
Software as Virtual Instrument (VI) object
Front Panel Controls, Indicators
Block Diagram arithmetic and logic functions
Types of Numbers and Variables
Editing and Debugging Programs
SubVI
Structures I: For loop, While loop, Formula Node, MathScript Node
Structures II: Case Structure, Shift Registers & Feedback
Arrays & Clusters
Charts & Graphs: Waveforms, XY Graphs
Polymorphisms of Simple Operators
Strings and File I/O
Introduction to Data Acquisition
Introduction to Data Analysis built-in functions
Introduction to Numerical Calculus tools in LabVIEW
(Some exercises are introduced in Excel)

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