

# **OPTI 469/569L: System programming for engineers**

## **Effective Fall 2016**

### **Course Description:**

The course aims to teach entry to intermediate level software development skills in the LabVIEW programming environment.

LabVIEW is a graphic programming environment that specializes in software development for measurement and control instruments. It is widely used in science and industrial research labs for designing and testing systems.

In this course, students will learn:

1. LabVIEW graphics programming environment
2. Programming structures and data types in LabVIEW
3. Hardware testing methods
4. VI editing and debugging methods
5. Modular programming
6. Basic VI architectures
7. Designing graphic user interface
8. Instrument automation
9. Data acquisition and file I/O
10. Basic realtime system programming

Homework consists programming projects in graphic interface development, multi-function data acquisition, hardware control and imaging acquisition. Class will meet weekly for lectures, project assignments and project reviews. Beyond weekly lecture, students are required to participate a 3-hour lab session per week to work on project assignments.

### **Pre-requisites:**

Students must have one prior course in programming language, such as C++, Java, MatLab etc. Knowledge about Object Oriented Programming is preferred.

### **Number of Units/ component:**

2 units.

### **Locations and Times:**

Lecture: Monday 1:00-1:50 PM

Lab session: TBD

### **Instructor Information:**

Leilei Peng  
Meinel 614  
Email: lpeng@optics.arizona.edu

Office hours: TBD

**Expected Learning Outcomes:**

Upon finish the course, students are expected to

1. Be able to program basic data acquisition instruments.
2. Be able to design graphic user interface for measurement and instrument automation.
3. Understand basic concepts of modular programming and software architecture.

**Required Texts and Software:**

Students are required to use their own laptops for programing in lab sessions. Laptops must satisfy the system requirement for installing LabVIEW 2015 (32 bits Windows version). Bring a laptop to the class lecture is strongly recommended, as programming demos will be screen-shared online during the class.

LabVIEW installation disks are available for sign out from OSC Technology Management Group. Install packages call also be downloaded from NI's website:

32 bits: <http://www.ni.com/download/labview-development-system-2015/5308/en/>

Once LabVIEW is installed, please follow the instruction bellow to set up the license server:

<http://softwarelicense.arizona.edu/campus-network-connected-systems-download-instructions>

The UA LabVIEW site license is valid for all campus network connected computers. To use LabVIEW, your computer must be connected to Internet through UA network physically or through VPN.

***The Mac version of LabVIEW has very limited functions, and will not be supported in the class,***

**Number of Exams and Papers:**

No exams

**Course Policies:**

Grading Policy

Programming Projects	80%
<u>In class quiz</u>	<u>20%</u>
Total	100%

Additional requirements to graduate students:

Besides program functionality and stability, following factors will also be considered during homework grading: code readability, program architecture, and the quality of user interface.

### **Academic Integrity** (<http://web.arizona.edu/~studpubs/policies/cacaint.htm>)

According to the Arizona Code of Academic Integrity, “Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student’s submitted work must be the student’s own.” Unless otherwise noted by the instructor, work for all assignments in this course must be conducted independently by each student. Co-authored work of any kind is unacceptable. Misappropriation of exams before or after they are given will be considered academics misconduct.

Misconduct of any kind will be prosecuted and may result in any or all of the following:

- Reduction of grade
- Failing grade
- Referral to the Dean of Students for consideration of additional penalty, i.e. notation on a student’s transcript re. academic integrity violation, etc.

### **Attendance Policy**

It is important to attend all classes, as what is discussed in class is pertinent to adequate performance on assignments and exams. If you must be absent, it is your responsibility to obtain and review the information you missed. This is especially important in this course where a substantial amount of course material will emerge through class discussion.

"All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored."

### **Classroom Behavior**

The Arizona Board of Regents’ Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one’s self. See: <http://policy.web.arizona.edu/threatening-behavior-students>.

### **Students with Disabilities**

If a student is registered with the Disability Resource Center, he/she must submit appropriate documentation to the instructor if he/she is requesting reasonable accommodations. (<http://drc.arizona.edu/instructor/syllabus-statement.shtml>).

*The information contained in this syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.*