CHM 6158C: Electronics and Instrumentation

Spring Semester 2012 (3 credits)

Instructor:	Nick Polfer, 311C Chemistry Lab Building (CLB), polfer@chem.ufl.edu, 392-0492
TA:	Nathan Roehr, roehr@chem.ufl.edu Shen Zou, shenzou@ufl.edu
Office hours:	Preferably during laboratory sessions and discussion sessions.
Aims:	To provide students with an understanding of the principles and applications of electronic devices and techniques in modern computerized scientific measurements.
Textbooks:	The lecture notes will be based on the following textbooks (**no** need to purchase, all lecture material will be provided): 1. The Art of Electronics, Paul Horowitz, Winfried Hill, 2nd Edition, Cambridge University Press, ISBN 978-0-521-37095-0. 2. Teach Yourself Electricity and Electronics, Stan Gibilisco, 3rd Edition, McGraw-Hill, ISBN 0-07-137730-1.
Venue:	FLI 109 (Flint). Lectures and lab periods will take place in this classroom.
Lectures:	T, R 5th period (11:45 am - 12:35 pm) We will try to re-arrange schedule to 1 double-lecture each week The lectures can be found online on: http://www.chem.ufl.edu/~polfer/CHM6158C.html
Exams:	Midterm and final exams will cover lecture material.
Course policies:	Attendance at all class/discussion sessions and **at least 6 hours of lab per week** is expected. Absences and make-ups must be discussed and arranged with the instructor, as should any make-up exams for the midterm and final. Students should also familiarize themselves with the UF Student Honor Code posted at www.chem.ufl.edu/~itl/honor.html. Students with

disabilities must first register with the Dean of Students Office; the Dean of the Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

Lab experiments:

- There are a total of 7 lab units that will be covered as a part of the laboratory part of the course. The sequence of experiments deal with measurement instrumentation, digital logic, data acquisition using LabVIEW, power supplies, op amps, etc. The Arduino lab (lab X) will the "wild card", and will be done alternately by a different student.
- A lab "period" consists of a 3-hour lab session. The lab hours will be agreed upon at the end of the second week of classes.
- Students are required to hand in lab reports within **1 week of completing the lab**. Note that performance in these lab units largely determines the grade (see below).
- While discussion of the lab material with colleagues is encouraged, the lab report must be completed independently by each student. **Plagiarism will not be tolerated and will be reported**.

EXPERIMENTS: Laboratory experiments will cover the following areas:

Unit X: Arduino Lab

Unit 1: Breadboarding, DC Voltage Measurements, Analog Signals

Unit 2: Digital Signals, Logic Gates, Flip-Flops, and Counters

Unit 3: LabVIEW and Virtual Instruments

Unit 4: AC Measurements

Unit 5: Operational Amplifiers and Power Supplies

Unit 6: Final Project

Lab #	Topic	# Periods	Max. # Points	Due Date
X	Arduino	1	10	variable
1	Breadboarding, V measurements	2	20	TBA
2	Digital Logic, Counters	3	30	TBA
3	LabVIEW	5	50	TBA
4	Op Amps and Power Supplies	4	40	TBA
5	AC Measurements	4	40	TBA
6	Final Projects	6	60	TBA
Lab Total		25	250	
Midterm Exam Final Exam			20 30	
Course Total			300	

Suggested grading scale:

Points Earned	Course Grade
260 - 300	A
240 - 259	B+
220 - 239	B
200 - 219	C+
180 - 199	C
160 - 179	D+
140 - 159	D
< 139	E

Tentative Lecture Schedule CHM 6158C

Date	Topic	Unit
T 01/10	**1.** Course logistics	
R 01/12	**2.** DC circuits, Kirchhoff's Laws	
T 01/17	**3.** Capacitors, diodes, transistors	
R 01/19	**4.** DMM, oscilloscope, function generator	
T 01/24	**5.** Binary number system, electrically encoded information	**1**
R 01/26	**6.** Digital logic, logic families	**1**
T 01/31	**7.** *Discussion*	**2**
R 02/02	**8.** Flip flops, counting measurements	**2**
T 02/07	**9.** LabView Introduction	**2**
R 02/09	**10.** LabView hardware	**3**
T 02/14	**Guest lecture.** LabView applications (Damon Allen)	**3**
R 02/16	**11.** Filters, noise, digitization	**3**
T 02/21	**12.** *Discussion*	**3**
R 02/23	**13.** DC power supplies	**3**
T 02/28	**Mid-term EXAM**	**4**
R 03/01	**14.** Op amps	**4**
T 03/06	*No class (Spring break)*	
R 03/08	*No class (Spring break)*	
T 03/13	*Exam discussion*	**4**
R 03/15	**15.** Op amp circuits	**4**
T 03/20	**16.** *Discussion*	**X**
R 03/22	**17.** AC circuits	**5**
T 03/27	**18.** Microcomputers	**5**
R 03/29	**19.** *Discussion*	**5**
T 04/03		**5**
R 04/05		**6**
T 04/10		**6**
R 04/12		**6**
T 04/17		**6**
R 04/19		**6**
T 04/24		**6**
	Final exam	