Cover Sheet: Request 9593

Electronics and Instrumentation

Info

Process	Undergraduate Courses
Status	Pending
Submitter	Fanucci,Gail E fanucci@chem.ufl.edu
Created	9/23/2014 9:11:03 AM
Updated	3/19/2015 11:41:55 AM
Description	We are requesting a co-listing of an existing graduate level course in electronics and instrumentation to serve as an advanced elective for our majors. By co-listing we mean generating an undergraduate course that parallels the graduate level class.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CLAS - Chemistry 011606000	Brucat, Philip J		9/23/2014
College	Approved	CLAS - College of Liberal Arts and Sciences	Pharies, David A		11/13/2014
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Gebhardt, Susan	Added to the December agenda	11/21/2014
University Curriculum Committee	Recycled	PV - University Curriculum Committee (UCC)	Gebhardt, Susan	This requests "co-listing of an existing graduate level course", but no syllabus is included. When this new syllabus and the existing graduate syllabus are provided, the proposed course will be reviewed as a joint course.	12/17/2014
College	Approved	CLAS - College of Liberal Arts and Sciences	Pharies, David A		3/19/2015
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			3/19/2015
SCNS Approval					
Student Academic Support System Implementation					

UF UNIVERSITY of FLORIDA

UCC1: New Course Transmittal Form

Department Name and Number: Chemistry SMA 065

Recommended SCNS Course Identification

Prefix: C H M Level: 4 Course Number: 1 x x Lab Code: Combined (C

Full Course Title: Electronics and Instrumentation

Transcript Title (please limit to 21 characters): Electronics & Instr.

Effective Term and Year: Spring 2015

Rotating Topic: ☐ yes ■ no

Amount of Credit: 3

Contact Hour: Base 7 or Headcount ___

S/U Only: ☐ yes ■ no

Repeatable Credit: ☐ yes ■ no If yes, ___ total repeatable credit allowed

Variable Credit: ☐ yes ■ no If yes, ___ minimum and ___ maximum credits per semester

Course Description (50 words or less)

Principles of operation of instrumentation, optimization of instrumental conditions and interpretation of instrumental data for qualitative and quantitative analysis. Application of electronic principles necessary to code for automated electronic measurements in chemical research.

Prerequisites

CHM 4130, or CHM3400 and CHM4413L, or permission of instructor

Co-requisites

none

Degree Type (mark all that apply): ■ Baccalaureate ☐ Graduate ☐ Professional ☐ Other ___

Category of Instruction: ☐ Introductory ☐ Intermediate ■ Advanced

Rationale and place in curriculum

This course will be unique in the Chemistry curriculum that will offer students with no prior knowledge of electronics or coding the necessary skills and expertise to automate electronic measurement devices employed in chemical research. Currently this course is being offered as a graduate level course CHM6158C. By co-listing this course, our undergraduate students have the option of an elective course that will prepare them and provide a cutting edge when they apply for either jobs within industry or graduate school.

Department Contact	Name Gail E Fanucci Phone 352-293-2345	Email fanucci@chem.ufl.edu
College Contact	Name David Pharies Phone 352-392-2264	pharies@ufl.edu Email

UF UNIVERSITY of FLORIDA

College of Liberal Arts and Sciences
Chemistry Department

Nicolas C. Polfer
PO Box 117200
Gainesville, FL 32611-7200
CLB 311C
polfer@chem.ufl.edu
(o) 352-392-0492

Concerning: **Undergraduate listing for CHM 6158c Electronics and Instrumentation**

September 1, 2014

Dear Committee,

I am writing this letter to propose an undergraduate listing for the graduate chemistry course above. Please find the syllabi for the graduate and (proposed) undergraduate courses herewith.

The proposed undergraduate course differs in the number of laboratory units that are required, namely 5 units in total, as opposed to 7 units for the graduate course. Units 1-4 (DC voltage measurements, logic circuits, LabView, and op-amps), as well as the student project (unit 6) are required for both courses. Units 5 (AC measurements) and X (Arduino microcomputer) are not required for the undergraduate students. Given the time constraints for undergraduate students, and the time-consuming nature of these laboratory exercises, it was deemed that these particular laboratory exercises would be best removed, so as to free up five laboratory sessions. This would allow undergraduate students to spread the laboratory units over more weeks, and thus lessen the work load per week.

Both graduate and undergraduate students would be expected to cover the same lecture material, and thus also take the same exams. The electronics and coding background knowledge of chemistry students is rather limited, and thus undergraduate students would not be expected to be at a disadvantage in this respect.

Sincerely yours,

Nicolas Polfer, Ph. D.
Associate Professor, Chemistry

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UCC: Syllabus Checklist

All UCC1 forms and each UCC2 form that proposes a change in the course description or credit hours must include this checklist in addition to a complete syllabus. Check the box if the attached syllabus includes the indicated information.

Syllabus MUST contain the following information:

- ☑ Instructor contact information (and TA if applicable)
- ☑ Course objectives and/or goals
- ☑ A weekly course schedule of topics and assignments
- ☑ Required and recommended textbooks
- ☑ Methods by which students will be evaluated and their grades determined
- ☑ A statement related to class attendance, make-up exams and other work such as: "Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx."
- ☑ A statement related to accommodations for students with disabilities such as: "Students requesting classroom accommodation must first register with the Dean of Student Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation."
- ☑ Information on current UF grading policies for assigning grade points. This may be achieved by including a link to the appropriate undergraduate catalog web page https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.
- ☑ A statement informing students of the online course evaluation process such as: "Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu."

It is recommended that syllabi contain the following information:

1. Critical dates for exams and other work
2. Class demeanor expected by the professor (e.g., tardiness, cell phone usage)
3. UF's honesty policy regarding cheating, plagiarism, etc. Suggested wording: UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor of TAs in this class.
4. Phone number and contact site for university counseling services and mental health services: 392-1575, http://www.counseling.ufl.edu/cwc/Default.aspx
   University Police Department: 392-1111 or 9-1-1 for emergencies.

The University's complete Syllabus Policy can be found at:
http://www.aa.ufl.edu/Data/Sites/18/media/policies/syllabi_policy.pdf

CHM 41XX: Electronics and Instrumentation

Spring Semester 2015 (3 credits)

Instructor:	Nick Polfer, 311C Chemistry Lab Building (CLB), polfer@chem.ufl.edu, 392-0492
TA:	Ning Zhao, nzhao@chem.ufl.edu
Office hours:	TBA
Course description:	CHM 41XX is a combined lecture and laboratory class, providing students with an understanding of the principles and applications of electronic devices and techniques employed in modern computerized scientific measurements in analytical/physical chemistry.
Objectives:	It is expected that by the end of the course students will be familiar with basics of electronics circuits, including Dc measurements, logic circuits, and op-amp circuits. The students will also have acquired sufficient coding experience, and should be able to design a LabView project to automate and control laboratory 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 4th period (10:40 am – 11:30 am) The lectures will be made available on an E-learning web environment.
Exams:	Two exams, one midterm and one final exam, will review the lecture material.
Course	Attendance at all class/discussion sessions and **at**

Policies:

least 6 hours of lab per week is expected. Any absences are subject to UF regulations https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

As a courtesy, it is expected that students arrive on time and that they mute their cell phones during class.

Requirements for class **attendance** and **make-up exams**, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

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**.

The assignment of grade points follows the UF **grading policies**, see undergraduate catalog https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These **evaluations** are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu

Lab experiments:

- There are a total of 5 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.

- A lab “period” consists of a 3-hour lab session. The following times are reserved for lab periods:

  Every day periods 6-8 (12:50 – 3:50 pm)

- Instructions for the lab exercises will be posted on the E-learning website.
- 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**.
- The final project involves the design of an apparatus or software program that can control or automate measurements in the laboratory. Ideally, this project aids the student’s research endeavors.

EXPERIMENTS: Laboratory experiments will cover the following areas:

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: Operational Amplifiers and Power Supplies

Unit 6: Final Project

Lab #	Topic	# Lab sessions	Max. # Points	Due Date
1	Breadboarding, V measurements	2	15	TBA
2	Digital Logic, Counters	3	25	TBA
3	LabVIEW	5	40	TBA
4	Op Amps and Power Supplies	4	30	TBA
6	Final Projects	5	50	TBA
Lab Total		24	200	
Midterm Exam Final Exam			50 50	
Course Total			260	

Suggested grading scale:

Undergraduates	Letter Grade	GPA
240 - 260	A	4.0
225 - 239	A-	3.67
205 - 224	B+	3.33
190 - 204	B	3.0
180 – 189	B-	2.67
170 - 179	C+	2.33
160 - 169	C	2.0
150 - 159	C-	1.67
140 - 149	D+	1.33
130 - 139	D	1.0
120 - 129	D-	0.67
< 120	E	0

Tentative Lecture Schedule CHM 6158C

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

Final exam

CHM 41XX: Electronics and Instrumentation

Spring Semester 2015 (3 credits)

Instructor:	Nick Polfer, 311C Chemistry Lab Building (CLB), polfer@chem.ufl.edu, 392-0492
TA:	Ning Zhao, nzhao@chem.ufl.edu
Office hours:	TBA
Course description:	CHM 41XX is a combined lecture and laboratory class, providing students with an understanding of the principles and applications of electronic devices and techniques employed in modern computerized scientific measurements in analytical/physical chemistry.
Objectives:	It is expected that by the end of the course students will be familiar with basics of electronics circuits, including Dc measurements, logic circuits, and op-amp circuits. The students will also have acquired sufficient coding experience, and should be able to design a LabView project to automate and control laboratory 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 4th period (10:40 am – 11:30 am) The lectures will be made available on an E-learning web environment.
Exams:	Two exams, one midterm and one final exam, will review the lecture material.
Course	Attendance at all class/discussion sessions and **at**

Policies:

least 6 hours of lab per week is expected. Any absences are subject to UF regulations https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

As a courtesy, it is expected that students arrive on time and that they mute their cell phones during class.

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Lab experiments:

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supplies, op amps, etc.

- A lab “period” consists of a 3-hour lab session. The following times are reserved for lab periods:

  Every day periods 6-8 (12:50 – 3:50 pm)

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- The final project involves the design of an apparatus or software program that can control or automate measurements in the laboratory. Ideally, this project aids the student’s research endeavors.

EXPERIMENTS: Laboratory experiments will cover the following areas:

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: Operational Amplifiers and Power Supplies

Unit 6: Final Project

Lab #	Topic	# Lab sessions	Max. # Points	Due Date
1	Breadboarding, V measurements	2	15	TBA
2	Digital Logic, Counters	3	25	TBA
3	LabVIEW	5	40	TBA
4	Op Amps and Power Supplies	4	30	TBA
6	Final Projects	5	50	TBA
Lab Total		24	200	
Midterm Exam Final Exam			50 50	
Course Total			260	

Suggested grading scale:

Undergraduates	Letter Grade	GPA
240 - 260	A	4.0
225 - 239	A-	3.67
205 - 224	B+	3.33
190 - 204	B	3.0
180 – 189	B-	2.67
170 - 179	C+	2.33
160 - 169	C	2.0
150 - 159	C-	1.67
140 - 149	D+	1.33
130 - 139	D	1.0
120 - 129	D-	0.67
< 120	E	0

Tentative Lecture Schedule CHM 6158C

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

Final exam

CHM 6158C: Electronics and Instrumentation

Spring Semester 2015 (3 credits)

Instructor:	Nick Polfer, 311C Chemistry Lab Building (CLB), polfer@chem.ufl.edu, 392-0492
TA:	Ning Zhao, nzhao@chem.ufl.edu
Office hours:	TBA
Course description:	CHM 6158C is a combined lecture and laboratory class, providing students with an understanding of the principles and applications of electronic devices and techniques employed in modern computerized scientific measurements in analytical/physical chemistry.
Objectives:	It is expected that by the end of the course students will be familiar with basics of electronics circuits, including logic circuits, op-amp circuits, and AC measurements. The students will also have acquired sufficient coding experience, and should be able to design a LabView project to automate and control laboratory 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 4th period (10:40 am – 11:30 am) The lectures will be made available on an E-learning web environment.
Exams:	Two exams, one midterm and one final exam, will review the lecture material.
Course policies:	Attendance at all class/discussion sessions and **at least 6 hours of lab per week** is expected. Any absences are subject to UF regulations

https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

As a courtesy, it is expected that students arrive on time and that they mute their cell phones during class.

Requirements for class **attendance** and **make-up exams**, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

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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.
- A lab “period” consists of a 3-hour lab session. The following times are reserved for lab periods:

Every day periods 6-8 (12:50 – 3:50 pm)

- Instructions for the lab exercises will be posted on the E-learning website.
- 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**.
- The final project involves the design of an apparatus or software program that can control or automate measurements in the laboratory. Ideally, this project aids the student's research endeavors.

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: Operational Amplifiers and Power Supplies

Unit 5: AC Measurements

Unit 6: Final Project

Lab #	Topic	# Lab sessions	Max. # Points	Due Date
1	Breadboarding, V measurements	2	15	TBA
2	Digital Logic, Counters	3	25	TBA
3	LabVIEW	5	40	TBA
4	Op Amps and Power Supplies	4	30	TBA
5	AC Measurements	4	30	TBA
X	Arduino	1	10	TBA
6	Final Projects	5	50	TBA
Lab Total		24	200	
Midterm Exam Final Exam			50 50	
Course Total			300	

Suggested grading scale:

Graduate students	Letter Grade	GPA
280 - 300	A	4.0
260 - 279	A-	3.67
240 - 259	B+	3.33
220 - 239	B	3.0
210 - 219	B-	2.67
200 - 209	C+	2.33
190 - 199	C	2.0
180 - 189	C-	1.67
170 - 179	D+	1.33
160 - 169	D	1.0
150 - 159	D-	0.67
< 150	E	0

Tentative Lecture Schedule CHM 6158C

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

Final exam