

**BE 4989 Advanced Experimental Methods for Engineers
Fall 2015**

Credit hours: 3 (3 hours lecture)

Location and Time: 115 E.B. Doran Bldg.; 9:30 -10:20 am MWF

Description: *Prerequisite: BE 2350 or equivalent. Current enrollment in BE 4290 and approval by instructor.* Design principles for measurement/control instrumentation pertaining to biological engineering applications; examples in experimental design methods for testing instrumentation prototypes

Objectives: To understand basic instrumentation design involving sensor, power supply, controller and DAQ selection. Hands-on work will include designing and fabricating electronic measurement setups for biological measurement applications; and will include an introduction to circuit schematic creation and background literature organizing tools.

Instructor: Ms. Anna Dugas, M.S.B.A.E,
Rm. 105 E.B. Doran Bldg,
Phone # 225-578-1083,
E-mail: acharron@lsu.edu;
Office hours: by appointment

Text: *Practical Electronics for Inventors*, third edition, by Paul Scherz and Simon Monk, 2013.

Criteria for Determining Grade:

Attendance	5%
Homework/Quizzes	15%
Midterm Exam	30%
Project	30%
Final Exam	20%

The final course grade will be determined from the following scale:

A+ = 100 ≥ 96%, A = 96 ≥ 92%, A- = 92 ≥ 90%

B+ = 90 ≥ 86%, B = 86 ≥ 82%, B- = 82 ≥ 80%

C+ = 80 ≥ 76%, C = 76 ≥ 72%, C- = 72 ≥ 70%

D+ = 70 ≥ 66%, C = 66 ≥ 62%, C- = 62 ≥ 60%

F = less than 60%

Course Policies, Regulations and Procedures:

Attendance and participation is required. The Instructor is not responsible for makeup work or informing students of makeup work.

Exams will typically be divided into open book and closed book sections.

Examinations missed due to an unexcused absence cannot be made up and a grade of zero will be given for each one missed.

Any students requiring special arrangements for taking exams, taking-notes and other special arrangements please see or contact the instructor within the first two weeks of class.

Please make an appointment by e-mail for in-person consultations. If we make an appointment and you cannot attend, please call and cancel as soon as you can. Email is the best way to contact me.

Web Page/ Supplemental Course Material

A course web page will be made available through Moodle to enhance the course contents. Students are requested to visit this web site on a regular basis. The course webpage contains the course syllabus, the lecture schedule, lecture handouts, and review materials.

Project Report Format

For your project, you will be tasked to design an instrument (from Senior Design) and propose your testing methods for the efficacy of the instrument. A 5-10 page midterm progress report and an 8-10 page final project report will be generated. Expected formatting examples and tips will available on the course Moodle page.

Academic Integrity and Academic Misconduct

Students are expected to comply with the Code of Student Conduct at all times throughout this course. For your information, the Code of Student Conduct can be found at:

[http://appl015.lsu.edu/slas/dos.nsf/\\$Content/Code+of+Conduct?OpenDocument](http://appl015.lsu.edu/slas/dos.nsf/$Content/Code+of+Conduct?OpenDocument)

See attached schedule of classes (subject to change)

<u>Day of</u>	<u>Topic</u>	<u>Assignment or Reading</u>
24-Aug	Introduction to course	Business letter update on project
26-Aug	Background research, Emily Frank, LSU library	Read chapter 7
28-Aug	Safety, Electronic Lab Equipment	
31-Aug	Power supply (AC)	Read Chapters 2.3, 3.2, 11, Apdx A
02-Sep	Power supply (DC)	
04-Sep	Solar Power Design	
07-Sep	LABOR DAY – no class	
09-Sep	Small Group – Introduction to projects	Quiz on power supply / solar
11-Sep	Small Group – Introduction to projects	
14-Sep	Sensors	Read Chapter 6
16-Sep	Sensors	
18-Sep	Arduinos	Read Chapter 13
21-Sep	DAQs and Dataloggers	
23-Sep	PID and other controllers	
25-Sep	Lab play day with Arduinos, DAQs	

28-Sep	DC Motors	Read Chapter 14
30-Sep	AC Motors	
02-Oct	Pumps	
05-Oct	Actuators	
07-Oct	Autodesk CFD	
10-Oct	Autodesk CFD	
12-Oct	Review for Midterm	
14-Oct	Midterm	
16-Oct	no class	
19-Oct	Data Analysis – Experimental Planning	Supplement reading
21-Oct	Data Analysis – Experimental Planning	
23-Oct	Data Analysis – Experimental Planning	
26-Oct	Small Group – discussion on initial experimental plans	
28-Oct	Small Group – discussion on initial experimental plans	
31-Oct	FALL BREAK – no class	
02-Nov	Human Factors Engineering	
04-Nov	Building circuits / Drawing schematics	Chapter 7.2
06-Nov	Fabrication techniques	
09-Nov	Small group – individual meetings	
11-Nov	Small group – individual meetings	
13-Nov	Small group – individual meetings	
16-Nov	Open Book Exam Assigned	
18-Nov	Project work day	
20-Nov	Project work day	
23-Nov	Project work day	
25-Nov	Prep for BE 4290 presentations, or proposals	
27-Nov	THANKSGIVING - no class	
30-Nov	Prep for BE 4290 presentations, or proposals	
02-Dec	Non-BE 4290 student presentations	
04-Dec	Follow-up from BE 4290 presentations	
11-Dec	Final Open Book Exam and Report Due by 9:30am (Friday)	