



ARIZONA STATE UNIVERSITY

**Department of Engineering**

**EGR334 Analog – digital interface**

**Section # 85095**

**Fall 2013 Syllabus**

**Course:** EGR334 Analog-digital interface (3 Credits)

**Course Description:** The course covers the signal processing and operational tools and techniques that lie between sensors and digital data processors.

**Extended description:**

Electronic instrumentation is steadily evolving from the days of stand-alone boxes that have to be manually connected and read. Now it is a critical part of all control functions. Progressive integration on silicon has reduced costs so widespread consumer applications are feasible. However, the stage between signal capture and digital processing presents most design and operations challenges. It is invariably the weakest link in the system and requires painstaking attention to detail for success.

**Textbooks:** A range of paper and web-based reading material will be provided. Students should purchase an Analog Discovery instrument box for the experimental work of the course.

**Software:** Microsoft Office applications are used extensively.

**Class Time:** Tuesday, Thursday, noon to 1.15 pm  
There is NO scheduled lab time. The Analog Discovery allows the experimental work to be done individually at any time and any place.

**Room:** Peralta 302

**Prerequisites:** Junior EGR standing

**Instructor:** Dr John Robertson

**E-Mail:** [jrobertson@asu.edu](mailto:jrobertson@asu.edu)

**Office:** Peralta 335B

**Telephone:** (480) 727-1211

**Office Hours:** Wednesday: 11 am – 4 pm or by appointment.

## Learning Objectives:

- Demonstrate the skills and techniques used to create, produce and sustain internationally competitive electronic instrumentation and test systems.
- Quantify contributions from devices, components, processes and tools on instrumentation specifications, performance and evolution.
- Apply selected operational techniques in lab activities.
- Develop skills to design, specify and evaluate performance of instrumentation in typical applications within constraints of cost, performance and technology.
- Develop the personal learning capabilities and skills to be successful in a competitive business environment.

## Class Information:

1. **Delivery:** The Blackboard system is used extensively. Class material is posted at least one week in advance and everyone is expected to follow the instructions, meet deadlines and keep up to date. Failure to do so will be reflected in grades.
2. **Schedule and scope:** The sequence of topics for the course is:

Week	Topic
1	Introductions
2	System features 2-ports
3	Amplifiers
4	Diff and RF amps
5	Sensor types
6	Filters
7	Audio apps
8	Precision references
9	Fall break
10	DAC
11	ADC
12	Multiplexing & sample
13	Power mgt
14	Noise
15	Lab/tutorial
16	Calibration & SOPs

3. **Expectations:** The effort, timing and behaviors expected are outlined in a paper that is distributed at the start of the course. The course follows the adult learning paradigm where students are accountable for their outcomes and development of their personal

learning process (with guidance). Any absence or disruption to the planned sequence should be notified in advance so alternative arrangements can be made.

4. **Homework Assignments:** Homework is assigned to assist understanding and develop skills. It comes in two forms: preparation before each class and follow-up or applications to reinforce the outcomes of the major topics. All assignments have a firm due date and no late assignments will be accepted unless special circumstances arise. Pre- and post-class assignments contribute to the overall grade. Late work and revised submissions after the stated deadline are not accepted.
5. **Experimental work:** There is a sequence of lab activities to demonstrate key features of instrumentation.
6. **Exams:** There are two exams - at the mid-point and end of the semester. Both cover all class material to that point. They operate under open book conditions with strict attribution policies.
7. **Grading:** The grading weight given to the major course activities is:
  - Pre-class preparation                      10 %
  - Lab planning                                      10
  - Lab reports                                        20
  - Portfolio    20
  - Mid-semester exam                            20
  - Final exam                                         20

The correlation between marks and letter grade will follow the following scale (subject to positive moderation to account for overall class performance):

100% - 90%	= A
89% - 80%	= B
79% - 70%	= C
69% - 60%	= D
59% - 0%	= E

## General Information:

1. Students are expected to participate in the educational process and not be a disruptive element with regard to the learning of others. Safety, self discipline and respect for others are necessary elements in the educational processes employed in this course.
2. All students should be familiar with the Student Code of Conduct, which can be found at <http://www.asu.edu/studentlife/judicial/>. Detailed information on the Student Code of Conduct may be found at <http://www.asu.edu/aad/manuals/usi/usi104-01.html>.
3. Students are expected to execute all course assignments and activities in accordance with the University's Student Academic Integrity Policy in the 2007-2008 general catalog located at <http://www.asu.edu/aad/catalogs/general/ug-enrollment.html#27839> under the heading *Retention and Academic Standards*.
4. The Americans with Disabilities Act (ADA) is a Federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. If you believe you have a disability requiring an accommodation please contact the Disability Resource Center at ASU Polytechnic located in Student Affairs Quad # 4 or call 480-727-1039 / TTY: 480-727-1009. Eligibility and documentation policies are online at <http://www.asu.edu/studentaffairs/ed/drc/>

J Robertson 8-14-13