

ECE 682 Projects for Winter 2010

<http://www.ece.osu.edu/~potter/ECE682>

Students in ECE 582/682 will design and implement a prototype device. The design documents prepared in ECE582 will be used as a starting point for the design cycles implemented during Winter Quarter in ECE682. Initial testing of one or more critical subcomponents during ECE 582 can provide a very effective base from which teams can successfully implement their design in ECE682.

Students are encouraged to meet the minimum requirements of the Texas Instruments Design Competition, even if the student team will not be entering the TI competition.

Listed below are several related suggested project topics; in addition, students can propose their own topics. These topics combine sensing and wireless communication.

- a. Fall alert. Implement a prototype device capable of detecting a patient's fall and initiating an emergency telephone call. The target application is in-home geriatric care. Upon detection, the device should initiate an audio query and record a response; for negative responses, the device should place emergency calls to two pre-programmed telephone numbers. The system should be wireless, wearable, and unobtrusive. The system will be judged on functionality, cost, and false-alarm rate. A successful system will be delivered with documentation sufficient for easy use; modular, well-documented code will enable transfer of the prototype into a marketable device.
- b. Position estimation. Design and implement a device capable of precision estimation of relative position. A successful device would permit low-cost hand-held ultrasound imaging and radar imaging. Students will assess the effectiveness of their prototype in terms of location precision, orientation precision, update rate, and reporting latency. Measurements may be reported via wired (USB, RS-232, etc.) or wireless (Zigbee, etc) connection. For the proof-of-concept prototype, computation may be implemented on a host computer. Well-documented, modular software must be written using Matlab; other software languages may be used only by permission of the instructor. The successful system will be delivered with documentation sufficient for easy use; modular, well-documented code will enable transfer of the prototype into an application device.
- c. Activity detection using ultrasound
- d. Wireless wearable monitor of human activity; device could also provide a calorimeter

About Costs

The cost is intended to reflect a per unit cost without amortization of development costs; accordingly, engineering time, testing equipment and development equipment are not included in the cost. Likewise, no cost will be associated with the PCs (desktop or laptop), software, and testing equipment available in DL569. The cost will include all parts in the prototype; estimated costs will be documented as the per unit wholesale price for quantities of 1000 or more. No taxes shall be included in computation of prices.

About Development Resources

Dreese Laboratories room 569 will be available as a development lab. The lab benches are equipped with PCs (including sound cards, microphones and speakers), oscilloscopes, function generators, and other test equipment.

About Parts

Teams will be reimbursed for development costs up to \$200 per team, provided valid receipts are submitted with an itemized list of expenses by the sixth week of the Winter Quarter, 2010. See the course web page for links to several vendors and other resources.

About Course Objectives

Project specifications reflect five course objectives:

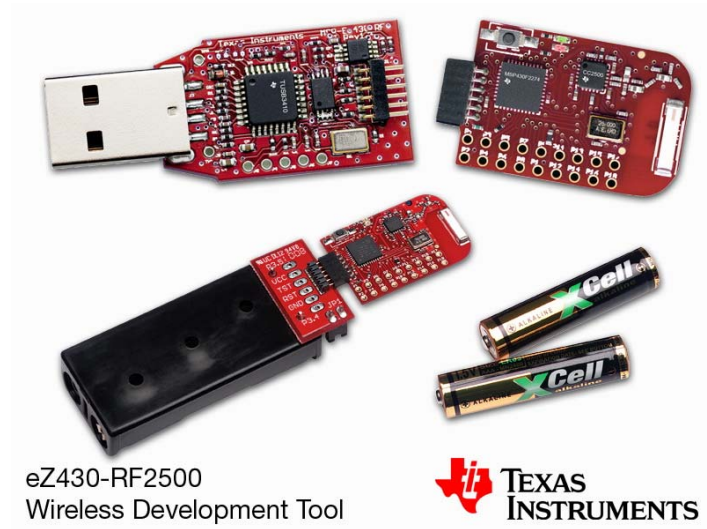
- a. meet and exceed the ABET goals: to apply modern engineering practices and techniques; to apply verbal and oral technical communication skills in documenting the design process; to encounter teamwork in performing design.
- b. provide a realistic, relevant product design experience.
- c. require implementation, testing and evaluation of one or more candidate designs.
- d. require productive teaming.
- e. allow successful completion during a one-quarter, three credit hour course.

Objectives (b) and (e) are, to some extent, competing; therefore, the project specifications are not sufficiently expansive to result in the design of a commercially marketable product. Nonetheless, the prototype design may provide the basic technology for a marketable product.

MSP430 Wireless Development Tool

<http://focus.ti.com/docs/toolsw/folders/print/ez430-rf2500.html>

<http://focus.ti.com/docs/toolsw/folders/print/ez430-rf2500t.html>



eZ430-RF2500
Wireless Development Tool



TMS320VC5505 eZdsp™ USB stick

http://focus.ti.com/docs/toolsw/folders/print/tmdx5505ezdsp.html?DCMP=DSP_c5505usbstick&HQS=Other+OT+c5505ezdsp_etf

CC1111EMK868-915 Evaluation Module Kit

<http://focus.ti.com/docs/toolsw/folders/print/cc1111emk868-915.html>