

CDA 6316 Embedded Systems Design

Credits: 3 credits

Text book, title, author, and year: Texas Instruments, Launch Pad documentation available on the web.

Also course technical handouts available on FAU Blackboard. Required Kits:

<http://www.ti.com/tool/msp-exp430g2>

Reference materials: Embedded System Design, A Unified Hardware/Software Introduction. By Frank Vahid and Tony Givargis. John Wiley & Sons, Inc., 2002.

Specific course information

Catalog description: A graduate system level software and hardware integration from design concepts to practical implementation covering both analog and digital signal conditioning and interface. The course projects include the design and interface of various sensors including basic ones such as temperature, humidity, pressure, and flow and advanced ones such as accelerometers, compasses, Gyros, GPS. On the output side, students explore with LEDs arrays, switch pads, servo and step motors, low voltage and high voltage actuators, etc. Communication between components is achieved at various levels, such as I2C, ISP, USB, RF, GSM and others. Many of the course projects target home automation but it is always open for all other general acquisition and control application. The microcontroller platform is dynamically changed over the semesters to stay up-to-date with latest technologies.

Prerequisites: *Prerequisites: COP2212, CDA3201C and CDA3331C. Or similar classes. Basic knowledge of C++, Java, .NET, Visual Basic, or any combination of the above. Most importantly, students must have the interest and the will and be self-motivated to acquire hardware and software hands-on*

Specific goals for the course: To keep the course technically current and useful, the theme of the class projects is innovatively changed every semester. Students are encouraged to build their own hot and challenging ideas. **Development Track-** Hardware/Software projects where you participate in real-life embedded systems at various levels: An overall system design, integration, and /or verification. A specific hardware or software subsystem design and/or development Interface design for sensors, actuators, communication ports, computers, and web servers. Application specification and user's interface design Available in the lab is a variety of cutting-edge hardware, software and subsystems technologies ranging from sensors to single chip computers and web servers.

Research Track - Research oriented students can search IEEE or other journals, universities/companies web sites, and/or any places on the internet for ideas and recent findings in the area of embedded systems. The final outcome is a publishable report which explores on some of the embedded systems research aspects. The report must include a significant amount of references.

1. To learn advanced hardware and software relations and co-design issues.
2. To learn advanced concepts of computer automation systems.
3. To develop advanced skills of interfacing between computing systems and real-world devices.
4. To acquire hands-on experience with working electronic and electromechanical sensors and actuators.
5. To demonstrate knowledge through class exercises and a main course project.

Brief list of topics to be covered:

1. Practical Interfacing techniques to analog and digital sensors and actuators
2. Serial communication with I/O devices
3. Motor and robotics interface]
4. The second half of the semester is devoted for constructing the term projects where most of the class time is spent on hands-on details.
5. Mainly the course is devoted to finish the construction of design project
6. Some fields trips may apply