EE5314 Class Notes

Introduction

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Dr. Jason Losh

Micro Track Courses

- EE3310: Undergraduate uP course
- EE4328: Undergraduate uC course
- EE5313: Basic Graduate uP course
- EE6313: Adv Graduate uP course
- EE5314: Basic Graduate uC course
- EE6314: Adv Graduate uC course
- EE5315: Graduate DSP course

Graduate Catalog

- 5314. EMBEDDED MICROCONTROLLER SYSTEMS (3-0). Hardware/software development techniques for microcontroller systems with emphasis on hardware-software interactions, programming internal peripherals, and real-time control and conditioning of external devices. Topics include: code efficiency issues, pin reuse issues, interrupt-driven processing, USART operations, I2C and SPI bus peripherals, and use of internal peripherals.

What You Should Know

- Very good knowledge of at least one microprocessor or microcontroller is mandatory.
- Essential background includes assembly language programming, memory organization, mapping, and timing, basic i/o interfacing, and interrupt operation. A good understanding of BJT and FET circuits, Fourier series and transforms, 1st and 2nd order control loops, and basic communications will also be very useful.

Course Topics

- Differences between Harvard and von Neuman architectures
- Differences of microcontroller and microprocessor architectures
- Comparison of standard microprocessor and digital signal processor memory bus and ALU architectures
  Study of 33FJ128MC802 microcontroller built-in devices including timers, PWM, interrupts, GPIO ports, and a/d converters

Course Topics

- Determining microcontroller memory, speed, and capabilities to solve a task
  Interfacing with SPI, serial, and CAN buses
- Measurement and instrumentation applications
- Digital filtering applications
  Device control: Motors, servos, relays, heavy AC and DC loads
- Real-time control applications

Course Microcontrollers

- Class processor changes every two years to the newest controller
- A free assembler and C compiler are available for these microcontrollers from Microchip

Microcontroller Datasheets

- PIC33FJ128MC802 Web Page
  - Many documents with more information
  - Print selected pages as necessary
- 33F128MC802 Data Sheet
  - 424 pages
  - Need to print most of this and have available for tests

Programmers

- Microchip ICD3 programmer/in-circuit debugger
  - $200 approximately
  - 30 are available for checkout to teams

Only 14 Weeks to Go!

- Reading
  - Download the Microchip 33 family datasheet and start studying the material, especially Chapters ?
  - Use the 33FJ128MC802 Web Page info to fill in the details
- Download Materials from the Class Web Page at http://omega.uta.edu/~jlosh
- Determine Your Project Team
  - Up to three members
  - Each member must contribute
  - Each member will be graded independently
- Plan to Spend a Substantial Amount of Time on the Project (approx 100 hours)