MTRX3700 Mechatronics 3

Introduction
Unit of Study Overview

- Second course in microprocessor-based design
- Modern Harvard architecture RISC processor – Microchip PIC18F452 (and PIC18F4520)
- Modern development tools – IDE, compiler, ICD3
- Focus on system design and development of microprocessor-based products
Unit of Study Overview

- Real-time operating systems in a μC context
- Further topics in advanced microprocessor systems
  - Memory hierarchy
  - Multiprocessing
  - RISC and DSP processors
  - Communications
- Really a second course in embedded systems
Teaching Personnel

- Lecturer: David Rye  d.rye@acfr.usyd.edu.au

- Tutors
  - Adrian Ball  a.ball@acfr.usyd.edu.au
  - Alex Zyner  a.zyner@acfr.usyd.edu.au

- Alex on Wednesdays, Adrian on Thursdays
Formal Classes

- Lectures
  - Wednesday 10:00 – 11:00 am  Mech Eng Tute Room 1
    (not full semester)
  - Thursday  11:00 – 1:00 pm  Mech Eng Tute Room 1

- Laboratory/Tutorial Sessions  - one of
  - Wednesdays 2:00 – 5:00 pm  Mechatronics Lab
  - Thursdays  2:00 – 5:00 pm  Mechatronics Lab
  - Compulsory lab induction in Week 1
  - Some tutorial sessions may be held in rooms other than the Mechatronics Lab – notice will be given in this case
Subject Plan

- We will cover a lot of material on the PIC18F452 in the first 3–4 weeks. Aim to cover the basics of the processor and tools quickly.

- Laboratory work will help you to build knowledge of peripherals, one by one. Don’t wait for the lectures!

- Lecture material will become more general, not specifically related to the PIC18F452.

- Group work in the laboratory (major project) will help you to develop knowledge of system design and some of the skills required when working in a team.
References

- Text Books
  - Peatman, J.B. *Embedded design with the PIC18F452 microcontroller*. Prentice Hall, 2003.
  - Peatman – second hand or Internet (co-op ~$150, order in)
    Data Sheet – from the Copy Centre now ($23).

- References
  - See the detailed Course Outline online for a list of references (and other things...)
  - Many documents, including datasheet, available in PDF form through Blackboard
  - Material on Lab Server
My Expectations

- Read the textbook, read the Data Sheet, read other sources, and not only when you are in the Lab
- Engage and think!

- Work at implementations until you get them correct
- I can’t promise to know everything, but I will promise to work *with you* to solve problems in the Lab

- Tell me if things go wrong – often group dynamics
- Tell me what is going well, too
Critical Skills

- To plan workload and work to a deadline
- To work effectively in a group
- To prototype hardware and software
- To have strong ability for analytical thinking and logical problem solving
- To debug effectively, including fluent use of an oscilloscope
- To use hand tools capably, including soldering
- To work and communicate at a standard approaching that of a professional engineer
Assessment

- Emphasise *learning*, not the mark attained

- Exam: 40% Two hour, annotated Data Sheet OK
  - Annotated means that you don’t have to get rid of the notes that you make in the lab.
  - Systematic annotation with lecture notes, etc will be regarded as cheating. Data Sheet will be inspected in exam.

- Projects: 60% Group mark (will be moderated)
This Week and Next Week

- **Lab inductions in Week One**
  - Mechatronics Lab, Wednesday or Thursday
  - Induction at 2:00 pm sharp
  - Please don’t be late as you may not be admitted

- **First lab class in Week Two**
  - Complete the MPLAB X / ICD 3 Tutorial
  - Get started on Assignment 1: PIC18F452 Software Exercises
What You Need to Do Now

- Choose a lab partner
  - See lists sorted by lab day on Blackboard > Admin
  - One of each pair email me, with copy to your lab partner, by 5:00 pm on Monday 3 August.
  - Those who don’t email me in time will be allocated a lab partner at random. These will be posted on website.

- On Blackboard
  - Read the Unit of Study Outline
  - Read the Lab Quick-Start Guide
  - Read the MPLAB X / ICD 3 Tutorial – For the lab in Week 2
  - Have a look at Assignment 1 – particularly first 3 pages