ELEC 2008 MICROCONTROLLERS AND PLCS

Credit Points 10

Legacy Code 300044

Coordinator Qi Cheng (https://directory.westernsydney.edu.au/search/name/Qi Cheng/)

Description Through completion of an applied project students will develop an understanding of the hardware, architecture and the assembly language of microcontrollers in addition to the control of a mechanical system with a programmable logic controller (PLC). The subject looks at the applications of timers, interrupts and serial ports. Furthermore, the general approach in designing a microcontroller in mechanical systems will be studied. Students will use an Omron PLC to control a factory represented by four pneumatic cylinders. After covering the Ladder Logic programming language, they will move on to cover sequential programming and numerical manipulation using PLCs.

School Eng, Design & Built Env

Discipline Computer Engineering

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 2 subject

Pre-requisite(s) ELEC 2004 OR
ELEC 1003 OR
ELEC 1009

Assumed Knowledge

Fundamentals of electronics are required.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Design small-scale microprocessor controlled mechanical systems.
2. Write software instructions to implement various microcontroller operations.
3. Program a PLC to control a mechanical system.
4. Use Ladder Logic to execute complex logic operations.
5. Use sequential programming and feedback from a mechanical system to control a complex sequence of tasks.
6. Use a PLC to perform numerical manipulation

Subject Content

1. Basics of number systems and Boolean algebra, hardware architecture of microcontrollers.
2. Assembly languages.
3. Timers, interrupts and their applications in microcontrollers.
4. Procedures of designing microcontroller based systems.
5. Operation of a pneumatic-mechanical system .
6. Ladder logic.
7. Sequential programming.
8. Numerical manipulation with PLCs.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Applied Project	50-100 Rungs of Programs	40	N	Individual
Practical	Continuous assessment of weekly programming exercises	30	N	Both (Individual & Group)
Numerical Problem Solving	2 Hours Open Book	30	N	Individual

Prescribed Texts

Bates, M 2011, *PIC microcontrollers an introduction to microelectronics*, 3rd edn, Newnes, Oxford.

Teaching Periods

Spring (2022)
Penrith (Kingswood)
Day
Subject Contact Qi Cheng (https://directory.westernsydney.edu.au/search/name/Qi Cheng/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=ELEC2008_22-SPR_KW_D#subjects)

Parramatta - Victoria Rd
Day
Subject Contact Qi Cheng (https://directory.westernsydney.edu.au/search/name/Qi Cheng/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=ELEC2008_22-SPR_PS_D#subjects)

Spring (2023)
Penrith (Kingswood)
On-site
Subject Contact Qi Cheng (https://directory.westernsydney.edu.au/search/name/Qi Cheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC2008_23-SPR_KW_1#subjects)

Parramatta City - Macquarie St
On-site
Subject Contact Qi Cheng (https://directory.westernsydney.edu.au/search/name/Qi Cheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC2008_23-SPR_PC_1#subjects)