

**DEPARTMENT OF ELECTRONIC ENGINEERING**

**Unit Quality Assurance Report**

**YEAR:** 2008  
**SEMESTER:** 1  
**UNIT CODE:** ELE2MDD  
**UNIT TITLE:** Microprocessors and Digital Design  
**LECTURER(S):** Robert Ross  
**CLASS SIZE:** 54

---

**UNIT OBJECTIVES/OUTLINE:**

This unit included an overview of fundamental digital logic design, an introduction to microprocessors and assembly language programming. A MSP430 microcontroller was programmed in the laboratories and used as an example of a versatile, low-power, 16 bit microcontroller. Topics covered in the unit were: State machine design, microprocessor architectures, assembly language, interfacing, serial communications and memory. The unit includes problem classes and laboratories which allow the students to develop programs in assembly language and debug these programs on their own microcontroller boards.

**SURVEY RESULTS AND ANALYSIS OF INDIVIDUAL QUESTIONS:**

The survey sample for this subject was 33 students, representing 61% of the total class size of enrolled students.

The summary of the questionnaire is:

Qa: The unit helped me develop as a team member: 3.8

Not relevant for this unit. Two of the labs required students to work in pairs, the remainder of the labs required students to develop assembly code and so students were encouraged to work on their own workstation to maximise their programming learning experience.

Qb: Work in the unit helped me enhance my analytic skills: 4.2

A score of 4.2 was a particularly good outcome for this unit as a major aim was getting students to analyse problems and solve them in a digital domain. Development of analytic skills was primarily borne out through laboratories and in assignments.

Qc: Learning in this unit helped me develop my problem-solving skills: 4.3

Problem solving skills were also particularly relevant for this subject as it focussed on design – both in a digital domain and using microcontrollers. The score of 4.3 illustrates that students grew in their problem solving skills and were able to tackle new and difficult problems.

Qd: I have developed my communication skills in this unit: 3.6

The intention for this unit was to develop technical skills rather than communication skills. Written communications skills were developed primarily in the labs and assignments – where students were asked to record observations, make inferences and write answers to specific questions. This lower score reflects the more technical nature of the subject.

Qe: The unit has helped enhance my confidence tackling unfamiliar problems: 4.3

This unit is heavily problem solving based – with labs which begin with fundamental problems and steadily increase in difficulty. This relatively high score could possibly be raised even further by having a greater depth of problems to be solved within problem classes and in the labs.

Qf: The unit helped me to develop the capacity to plan my work: 4.1

The unit is well structured – with regular lectures, labs, assignments and tutorials – making planning relatively simple. It would have been nice to see more students completing assignments – an issue which will be raised in the first lecture next semester. The score reflected the good transparency and layout of the subject and will be improved by taking into account all public holidays throughout the semester.

Qg: I improved my oral communication skills: 3.5

This unit is meant to develop technical skills rather than communication skills or oral communication skills specifically. Lab classes are the primary place this subject allows for development of oral communication skills. In lab classes demonstrators were instructed to cross-examine students on their work to ensure they understood what they were doing. The relatively low mark reflects the fact that development of oral communications skills are not a core aim for this unit.

Q1: The aims of the unit were made clear at the start: 4.4

The aims of the unit were clearly stated in the unit guide (syllabus) as well as in the first lecture. Some confusion may have been introduced as this subject is new and the unit outline in the handbook reflected information from previous subjects which were no longer relevant. On the whole students understood the aims with high clarity and hence ranked the subject accordingly.

Q2: The teaching staff put a lot of time into commenting on my work: 4.4

The class for 2008 had a total of 54 students, which provided some hectic moments in some of the labs. The students openly praised the demonstrators (Andrew Martchenko and Tony de Souza-Daw) along with the lecturer on the quality help and feedback provided within the labs. Although the number of demonstrators is higher than in some subjects – student learning was significantly aided - especially for learning a new assembly language. The students appreciated the feedback and comments received and reflected this in their ranking.

Q3: I was generally given enough time to understand the things I had to learn: 4.5

This answer reflects the high levels of integration that were deliberately designed into the unit. Labs, tutorials and assignments all supported the lecture notes giving students multiple avenues and opportunities to learn and understand new concepts. I'm happy with this result.

Q4: The staff made a real effort to understand the difficulties I was having with my work: 4.5

Most of the consultation for students were carried out through tutorials and labs, with fewer than a dozen out-of-class discussions with students. It was made clear to students that the teaching staff were happy to discuss difficulties with students. Most of those with difficulties queried these first via email and were generally satisfied with the result. I'm happy with the response from students for this question and will endeavour to provide quality support for student encountering difficulties.

Q5: Appropriate forms of assessment were used in this work: 4.5

The assessment was in the form of labs (no reports), assignments and the exam. The assessment was made clear to the students at the start and on the whole many performed very well – and those that didn't recognised that it was their responsibility

to complete the assignments. Once again I was disappointed at the level of assignment completion and will discuss this with students in 2009. Otherwise I was very happy with the result.

Q6: Teaching staff gave me helpful feedback: 4.5

The feedback score was again quite high - due to the quality assistance provided by the lab demonstrators as well as the lecturer - both in labs, tutorials and also private consultation. Students appreciated this and enjoyed the labs in particular.

Q7: The teaching staff were extremely good at explaining things: 4.5

This high mark reflects the lecturers and demonstrators ability to relate difficult concepts to students in a simple to understand manner. Students were on the whole extremely happy and the main avenue for improvement could possibly be more training to ensure the demonstrators were fully familiar with the programming language.

Q8: The workload was manageable: 4.5

Students gave this a particularly high score, which makes me a little suspicious they were not challenged as much by this unit as they could be been. Having said that – there a significant number of contact hours (6 hours) and with some dedication students should be able to complete most of the work (except assignments) well within those contact hours. Possibly a few more ‘research’ questions could be added to the assignments to get students to explore a little further in their own time.

Q9: The teaching staff worked hard to make this unit interesting: 4.6

This was the highest feedback mark provided for MDD, which is encouraging as a lecturer to see that I (along with the demonstrators) effectively motivated students. To aim even higher next year I will endeavour to build some props to use in class as practical examples in problem solving. An experimental teaching method of showing short MacGyver segments before each lecture to encourage analytical thinking was warmly encouraged by students and had them turning up early for lectures.

Q10: I was able to access the learning resources: 4.5

In the written part of the surveys some students were highly critical of the use of WebCT. Some major problems identified were: inability to access (not all the students were added at the start), files going missing, very slow access and certain files (.s43 assembly templates) not being supported properly by WebCT. To circumvent these issues all course material was mirrored onto the lecturers webpage – which was warmly welcomed by students and reflects the high mark.

Q11: The teaching staff motivated me to do my best work in this unit: 4.4

Once again a high mark reflected the motivation and encouragement provided by the teaching staff. Some students who were initially struggling with assembly language spoke glowing praises of it in the end – testament to the dedication and hard work of the lab demonstrators.

Q12: Overall I am satisfied with this unit: 4.5

Students were on the whole very happy with this subject (far happier than they were with the superseded subjects). I’m happy with this result and expect that it will grow even higher next year as the action points are acted upon.

### **Summary of Student’s Comments:**

“Lecturer was enthusiastic, excellent and helpful” x 8

“Excellent and helpful demonstrators” x 4

“Re-write Lab 1” x 3

“Great, fun and useful labs” x 4

- “Good course content” x 3
- “Robert’s website was better than WebCT” x 2
- “Wider and harder tutorials needed” x 2
- “All very good” x 2

## RESULTS

**54 Students, 42 pass, 8 fail, 5 sup, 4 NS, average mark 68.9%**

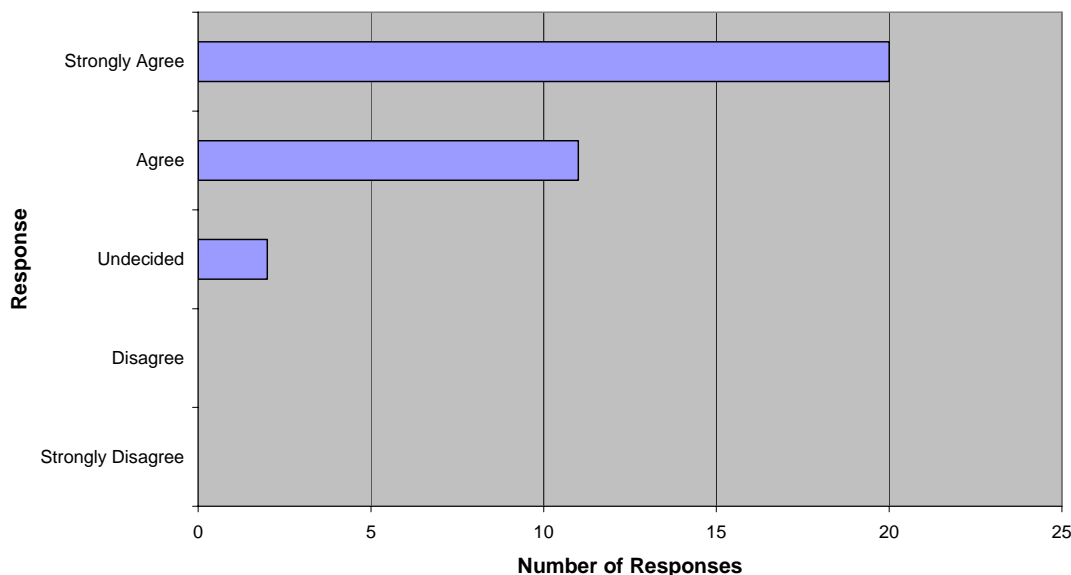
## DISCUSSION AND RECOMMENDATIONS REFERRING TO UNIT OBJECTIVES AND SURVEY RESULTS:

The unit appeared to run well and was enthusiastically praised by students. Students appeared to achieve good learning outcomes which will prepare them well for embedded processors in third year. One negative comment which was repeated regarded the difficulty of lab 1 – a hardware lab which was difficult to finish in the allocated time. This has been addressed by re-writing the lab – resulting in a simplified lab which will enable more students to finish and hopefully aid student learning.

Students gave glowing reviews of all aspects of ELE2MDD except for the tutorials – which were described as not wide enough or hard enough. Next year some additional questions will be added to the tutorials to address this criticism as well as swapping the order of the second and third tutorials. The balance of lab demonstrators (2 + lecturer) worked well and resulted students quickly coming to terms with assembly language and finding the labs to be generally an enjoyable and educational experience.

The overall satisfaction graph is reproduced below – showing a score 4.5 – a very pleasing result. As this unit was created to supersede two different units (ELE21DIG and ELE22MIC) the quality assurance data from both these units should be taken into account. The overall satisfaction of ELE21DIG was 3.4 and ELE22MIC was 2.7. The score received by ELE2MDD of 4.5 was therefore a huge boost, due in part to the complete overhaul of material from both units as well as the dedicated teaching staff.

**Overall, I was satisfied with this unit?**



**COMMENTS/RECOMMENDATION(S) FOR FOLLOWING YEAR:**

- Re-write lab 1 – already completed
- Expand the material covered in the tutorials
- Talk to students regarding assignment submission and completion

- 
- Statistical Information from the Academic Development Unit is attached.
- Statistical Information form the Academic Development Unit is not available due to insufficient student numbers.
- 
- I acknowledge that this report will be published on the Department of Electronic Engineering web site for viewing by the general public.

**LECTURER:** ..... **SIGNATURE:** ..... **DATE:** .....

**YEAR LEVEL COORDINATOR:** ..... **SIGNATURE:** ..... **DATE:** .....

**COMMENTS:**  
.....  
.....  
.....

---

**APPROVED:**

**HEAD OF DEPARTMENT:** ..... **SIGNATURE:** ..... **DATE:** .....

**COMMENTS:** An excellent new unit that revises and modernises the two “donor” units to create this 15CP unit. Meticulous material development and dedicated staff.