The University of Southern Queensland

Course Specification

Description: Embedded Systems Design

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-Nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
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<tr>
<td>ELE</td>
<td>2303</td>
<td>10586</td>
<td>1, 2002</td>
<td>WEB</td>
<td>1.00</td>
<td>TW MBA</td>
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Academic Group: FOENS
Academic Org: FOES04
HECS Band: 2
ASCED Code: 031305

STAFFING
Examiner: Mark Norman
Moderator: John Grant-Thomson

PRE-REQUISITES
Pre-requisite: ELE1301

SYNOPSIS
This course develops the techniques used in microcomputer design, interfacing and applications. It includes microcomputer architecture; assembly language programming; I/O methods and interface techniques for parallel and serial, synchronous and asynchronous systems; multiple interrupt I/O and DMA; interface examples involving RS232C, centronics and non standard microcomputer interfaces; bus standards including S100, VME and GPIB; and development of software for 8 bit and 16 bit microprocessors. A Microcomputer hardware and software design project is used to develop team design concepts.

OBJECTIVES
On successful completion of this course the student will be able to:

- evaluate the alternative I/O techniques available for use with computers; identify the I/O limitations placed on a microcomputer system (both hardware and software) by any given application, and select the appropriate I/O technique for interface implementation; explain the necessity for and implications of interrupt driven I/O; explain the necessity for and implications of DMA for high speed I/O;
- apply I/O techniques to a comprehensive computer system involving multiple peripherals; identify system timing constraints and priorities; selection appropriate software and/or hardware techniques; evaluate alternative systems for the implementation of multiple interrupts;
- explain the operating protocol and hardware specification of common bus and interface standards, eg GPIB, VME RS-232C, Centronics, etc;
• demonstrate proficiency in the use of a microprocessor development system for both software and hardware development;
• demonstrate proficiency in both programming and interfacing with the MC6809 and MC68000 microprocessor;
• create, validate and document structured software, and apply the techniques to design problems involving multiple interrupts and concurrent programming;
• investigate the implementation of team designing in computer engineering;
• perform a top down design of a microcomputer system. The design would include system design, microcomputer selection, software and interface design.

TOPICS

Description Weighting (%)  
1. Computer Architectures 10.00  
2. Assembly Language Programming 10.00  
3. Computer I/O Techniques 20.00  
4. Software Design and Documentation 10.00  
5. Development Systems 10.00  
6. Interrupts and DMA 15.00  
7. Bus Structures 10.00  
8. Microcomputer Hardware Design 15.00  

TEXT and MATERIALS required to be PURCHASED or ACCESSED:
Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at http://bookshop.usq.edu.au by entering the author or title of the text.
Nil.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Private Study</td>
<td>70</td>
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## ASSESSMENT DETAILS

<table>
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<tr>
<th>Description</th>
<th>Marks Out of</th>
<th>Wtg(%)</th>
<th>Required</th>
<th>Due Date</th>
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<tr>
<td>ASST 1 SOFTWARE DESIGN</td>
<td>200.00</td>
<td>20.00</td>
<td>Y</td>
<td>04 Mar 2002</td>
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<td>(see note 1)</td>
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<td>ASST 2 COMPUTER HARDWARE DESIGN</td>
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<td>(see note 2)</td>
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<tr>
<td>3 HOUR CLOSED EXAMINATION</td>
<td>600.00</td>
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<td>(see note 3)</td>
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### NOTES:

1. Further details about the due dates are detailed in the assessment section of the Course Specifications.
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### OTHER REQUIREMENTS

1. To pass the course, students must normally achieve at least 45% of the maximum possible marks in each assessment and not less than 500 marks for the whole course.
2. Higher grades will be awarded only when the student achieves at least 60% in the final examination, and normally not less than the following marks for the whole course: 65% - B, 80% - A, 90% - HD.
3. The final grades for students will be assigned on the basis of the aggregate of the marks obtained for each of the assessments and by considering the students' level of achievement of the objectives of the course.
4. A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.
5. The due date for an assignment is the date by which a student must submit the assignment to the USQ. The onus is on the student to provide proof of the submit date, if requested by the Examiner.
6. Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
7. In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.
8. If students submit assignments after the due date without prior approval then a penalty of up to 20% of the total marks for the assignment will apply for each working day late.
9. The final grades for students will be assigned on the basis of the aggregate of the marks obtained for each of the assessments in the course.
10. A closed examination is an examination where the candidates are allowed to bring only writing and drawing instruments into the examination.
11. The Faculty of Engineering and Surveying does not offer supplementary examinations.
12 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non-directed personal study.

13 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up; IDSM (Incomplete Deferred Examination and Make-up).