The University of Southern Queensland

Course Specification

Description: Real Time Systems

<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>
</tr>
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<tbody>
<tr>
<td>ELE</td>
<td>3307</td>
<td>24635</td>
<td>2</td>
<td>2003</td>
<td>ONC</td>
<td>1.00</td>
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Academic Group: FOENS
Academic Org: FOES04
HECS Band: 2
ASCED Code: 031305

STAFFING
Examiner: Mark Phythian
Moderator: John Grant-Thomson

PRE-REQUISITES
Pre-requisite: ELE1301

OTHER-REQUISITES
Pre-requisite: 70335

SYNOPSIS
Many engineering systems today involve the integration of computer hardware and software in the form of embedded algorithms and device controllers, particularly those operating in real time. Examples include digital signal processors (DSP's) for telecommunications systems, real time process control and device driver software to control hardware devices. This course aims to give students exposure to concepts related to real time systems and event driven programming, together with practical experience in the design of advanced engineering computer applications using low level operating system functions and hardware devices.

OBJECTIVES
On completion of this course, students should be able to:

- discuss the concept of event driven control in real time systems;
- create real time system specifications utilizing design techniques and tools;
- create real time kernels including polled loop, interrupt driven, state driven and phase driven code;
- design, create, compile and evaluate C programs;
- create and utilize algorithms and data structures;
• design and implement software solutions requiring multiple processes and/or threads, inter-process communications and synchronization to meet the requirements of a real time system specification.

TOPICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>1. Real Time Concepts</td>
<td>7.00</td>
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<tr>
<td>2. Real Time Software Design</td>
<td>15.00</td>
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<tr>
<td>3. Programming Languages for Real Time Applications</td>
<td>15.00</td>
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<tr>
<td>4. Coding Techniques and Algorithms</td>
<td>15.00</td>
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<td>5. Multi Tasking</td>
<td>15.00</td>
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<td>6. Interprocess Communication</td>
<td>15.00</td>
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<tr>
<td>7. Process Synchronisation and Timing</td>
<td>10.00</td>
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<td>8. Real Time Application</td>
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</table>

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.

ELE3307 Real Time Systems External Study Package, USQ Publication,

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.

Adams, P. M. & Tondo, C. 1990, Writing DOS Device Drivers in C, Prentice Hall,
Alexandridis, N. 1993, Design of Microprocessor - Based Systems, Prentice Hall,
Kauler, B. 1993, Windows Assembly Language and Systems Programming: Object Oriented and Low-Level Systems Programming in Assembly Language for Windows 3.x, Prentice Hall,
Norton, D. A. 1992, Writing Windows Device Drivers, Addison-Wesley,


**STUDENT WORKLOAD REQUIREMENTS**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Assessment</td>
<td>52</td>
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<tr>
<td>Directed Study</td>
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<tr>
<td>Examinations</td>
<td>3</td>
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<tr>
<td>Lectures</td>
<td>39</td>
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<tr>
<td>Private Study</td>
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<td>Tutorial</td>
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**ASSESSMENT DETAILS**

<table>
<thead>
<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>ASSIGNMENT 1</td>
<td>200.00</td>
<td>20.00</td>
<td>Y</td>
<td>01 Sep 2003</td>
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<tr>
<td>ASSIGNMENT 2</td>
<td>200.00</td>
<td>20.00</td>
<td>Y</td>
<td>20 Oct 2003</td>
</tr>
<tr>
<td>3 HOUR CLOSED</td>
<td>600.00</td>
<td>60.00</td>
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<td>END S2</td>
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<tr>
<td>EXAMINATION</td>
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**NOTES:**

- Student Administration will advise students of the dates of their examinations during the semester.

**IMPORTANT ASSESSMENT INFORMATION**

1. **Attendance requirements:**
   It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2. **Requirements for students to complete each assessment item satisfactorily:**
   (i) To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assignment. (ii) To complete the examination satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for the examination.

3. **Penalties for late submission of required work:**

4 Requirements for student to be awarded a passing grade in the course:
   To be assured of a passing grade, students must demonstrate, via the summative
   assessment items, that they have achieved the required minimum standards in
   relation to the objectives of the course by: (i) satisfactorily completing the
   examination and assignments; and (ii) obtaining at least 50% of the total weighted
   marks available for all summative assessment items. Students who do not qualify
   for a Passing grade may, at the discretion of the Examiner, be assigned additional
   work to demonstrate to the Examiner that they have achieved the required standard.
   It is expected that such students will have gained at least 45% of the total marks
   available for all summative assessment items.

5 Method used to combine assessment results to attain final grade:
   The final grades for students will be assigned on the basis of the weighted aggregate
   of the marks (or grades) obtained for each of the summative assessment items in
   the course.

6 Examination information:
   In a Closed Examination, candidates are allowed to bring only writing and drawing
   instruments into the examination.

7 Examination period when Deferred/Supplementary examinations will be held:
   Any Deferred or Supplementary examinations for this course will be held during
   the examination period at the end of the semester of the next offering of this course.

8 University Regulations:
   Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10
   Academic Misconduct for further information and to avoid actions which might
   contravene University Regulations. These regulations can be found at the URL
   http://www.usq.edu.au/SECARIAT/calendar/Part5/ or in the printed version of the
   current USQ Handbook.

**ASSESSMENT NOTES**

1 The due date for an assignment is the date by which a student must despatch the
   assignment to the USQ. The onus is on the student to provide proof of the despatch
   date, if requested by the Examiner.

2 Students must retain a copy of each item submitted for assessment. This must be
   despatched to USQ within 24 hours if required by the Examiner.

3 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.

4 The Faculty will normally only accept assessments that have been written, typed
   or printed on paper-based media.

5 The Faculty will NOT accept submission of assignments by facsimile.

6 Students who do not have regular access to postal services or who are otherwise
   disadvantaged by these regulations may be given special consideration. They should
   contact the examiner of the course to negotiate such special arrangements.
7 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.

8 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.

9 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); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).