Description: Algorithms and Data Structures

<table>
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<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>CSC</td>
<td>2401</td>
<td>25308</td>
<td>2, 2003</td>
<td>EXT</td>
<td>1.00</td>
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Academic Group: FOSCI
Academic Org: FOS003
HECS Band: 2
ASCED Code: 020111

STAFFING
Examiner: David Lai
Moderator: Ron House

PRE-REQUISITES
Pre-requisite: CSC1401

OTHER-REQUISITES
Recommended Pre-requisite: MAT1101

RATIONALE
Algorithms and Data Structures is one of the major courses in the Computer Science Curriculum recommended by ACM/IEEE-CS Joint Curriculum Task Force (1991). It is essential for students to gain a good knowledge of algorithms and data structures in order to be competent computer programmers. It is closely related to other computing courses, and students will find that this course is essential for other subsequent courses such as Operating Systems and Software Engineering.

SYNOPSIS
This course addresses various data structures and techniques for algorithm design and analysis. It covers basic data structures such as lists, stacks, queues, trees and graphs. The abstract data type techniques are also covered. The design of various algorithms such as searching algorithms, sorting algorithms and graph algorithms is discussed. This course also addresses other topics such as recursive algorithms and complexity analysis.

OBJECTIVES
On completion of this course the student will have learned or achieved:

- An in-depth understanding of various data structures as abstract specifications;
• Alternative implementations of data structures;
• Proper applications of algorithms and data structures in programs;
• Techniques for analysis of algorithms;
• Skills in selecting and designing algorithms, abstract data structures, and implementations.

**TOPICS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>1. Dynamic memory allocation, ADT concepts, Recursive algorithms</td>
<td>20.00</td>
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<tr>
<td>2. Algorithm analysis techniques</td>
<td>10.00</td>
</tr>
<tr>
<td>3. Lists, stacks, queues, heaps</td>
<td>18.00</td>
</tr>
<tr>
<td>4. Trees</td>
<td>15.00</td>
</tr>
<tr>
<td>5. Hashing</td>
<td>10.00</td>
</tr>
<tr>
<td>6. Sorting</td>
<td>15.00</td>
</tr>
<tr>
<td>7. Graph algorithms</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.

Students must have access to an ANSI C compiler. Option: If you don't have a compiler, you can buy the Department of Mathematics and Computing CDROM SET 1, 2003 (available from the USQ Bookshop). This CD set contains course material, Windows and Linux Software relevant to this course offering only. You may also wish to purchase the Department's CDROM SET 2, 2003 (available from the USQ Bookshop). This set contains a complete Redhat Linux distribution which is required for this course. For more information about the CD sets and their use, please refer to http://www.sci.usq.edu.au/cdrom.


**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>Directed Study</td>
<td>52</td>
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<tr>
<td>Examinations</td>
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<td>Private Study</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>ASSIGNMENT 1</td>
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<td>10.00</td>
<td>Y</td>
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<td>ASSIGNMENT 2</td>
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<td>15.00</td>
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<td>ASSIGNMENT 3</td>
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<td>15.00</td>
<td>Y</td>
<td>17 Oct 2003</td>
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<tr>
<td>SUMMATIVE EXERCISES</td>
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<td>3 HR CLOSED EXAMINATION</td>
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<td>50.00</td>
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NOTES:
- Refer to the Introductory Book for information about submission dates.
- Examination dates will be available during the semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
   There are no attendance requirements for this course. However, it is the students' responsibility 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:
   To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item.

3 Penalties for late submission of required work:
   If students submit assignments after the due date without prior approval then a penalty of 10% of the total marks gained by the student for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
   To be assured of receiving a passing grade a student must attempt all of the summative assessment items, achieve at least 50% in the examination, achieve at least 50% of the total marks allocated for the assignments, and at least 50% of the weighted marks for the 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 aggregate of the weighted marks 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

9 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.

10 Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.

11 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.

12 In the event that a due date for an assignment falls on a local public holiday in their areas, 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.

OTHER REQUIREMENTS

1 Students will require access to e-mail and internet access to USQConnect for this course.