Description: Algorithms and Data Structures

<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>CSC</td>
<td>2401</td>
<td>30364</td>
<td>1, 2004</td>
<td>ONC</td>
<td>1.00</td>
<td>WIBAY</td>
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Academic group: FOSCI
Academic org: FOS003
Student contribution band: 2
ASCED code: 020111

STAFFING
Examiner: Zhongwei Zhang
Moderator: Ron House

REQUISITES
Pre-requisite: CSC1401

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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</tbody>
</table>

**TEXT and MATERIALS required to be PURCHASED or ACCESSED:**

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

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, 2004 (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, 2004 (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 and the course web site.

Introductory Book 2004, *Course CSC2401/66201, Algorithms and Data Structures*, USQ Distance Education Centre, Toowoomba.


Study Book 2004, *Course CSC2401/66201, Algorithms and Data Structures*, USQ Distance Education Centre, Toowoomba.
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>Examinations</td>
<td>3.00</td>
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<tr>
<td>Laboratory or Practical</td>
<td>26.00</td>
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<tr>
<td>Classes</td>
<td></td>
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<tr>
<td>Lectures</td>
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<tr>
<td>Private Study</td>
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ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>16.00</td>
<td>16.00</td>
<td>08 Apr 2004</td>
</tr>
<tr>
<td>ASSIGNMENT 2</td>
<td>16.00</td>
<td>16.00</td>
<td>07 May 2004</td>
</tr>
<tr>
<td>ASSIGNMENT 3</td>
<td>18.00</td>
<td>18.00</td>
<td>28 May 2004</td>
</tr>
<tr>
<td>3 HR CLOSED EXAMINATION</td>
<td>100.00</td>
<td>50.00</td>
<td>END S1 (see note 1)</td>
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</table>

NOTES:

1. Examination dates will be available during the semester. Please refer to the examination timetable when published.

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:
   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 and achieve at least 50% of the total marks allocated for the assignments.

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 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/corporateservices/calendar/part5.htm or in 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 may be required to provide a copy of assignment submitted for assessment purposes. Such copies should be despatched to the USQ within 24 hours of receipt of a request to do so.

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.