



The University of Southern Queensland

## Course specification

This version produced 4 Jul 2008.

The current and official versions of the course specifications are available on the web at  
<<http://www.usq.edu.au/coursespecification/current>>.

Please consult the web for updates that may occur during the year.

### Description: Algorithms and Data Structures

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
CSC	2401	62266	1, 2007	ONC	1.00	Fraser Coast

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS003
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	020111

### STAFFING

Examiner: David Lai

### REQUISITES

Pre-requisite: CSC1401 or USQIT16

### 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:

1. demonstrate an in-depth understanding of various data structures as abstract specifications (Assignments 1 to 5, Exam);
2. use alternative implementations of data structures (Exam);
3. properly apply algorithms and data structures in programs (Assignments 1 to 5, Exam);
4. analyse algorithms using various techniques (Exam);
5. demonstrate skills in selecting and designing algorithms, abstract data structures, and implementations (Exam).

## TOPICS

	Description	Weighting (%)
1.	Dynamic memory allocation, ADT concepts, Recursive algorithms	20.00
2.	Algorithm analysis techniques	10.00
3.	Lists, stacks, queues, heaps	18.00
4.	Trees	15.00
5.	Hashing	10.00
6.	Sorting	15.00
7.	Graph algorithms	12.00

## 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: Although subject to change, at this stage, it is expected students may require access to Semester 1, Department of Mathematics and Computing DVDROM SET, 2007 (available from the USQ Bookshop). This DVD set contains Semester 1 course material, Windows software and a complete Linux distribution necessary for this course. For more information about the DVD set and its use, please refer to <http://www.sci.usq.edu.au/dvdrom> and the course web site.

Introductory Book 2007, *Course CSC2401 Algorithms and Data Structures*, USQ Distance and e-Learning Centre, Toowoomba.

Standish, TA 1995, *Data structures, algorithms and software principles in C*, Addison-Wesley, Reading, Mass.

(or Goodrich, M, Tamassia, R & Mount, DM 2004, *Data Structures and algorithms in C++*, Wiley, New York)

Study Book 2007, *Course CSC2401 Algorithms and Data Structures*, USQ Distance and e-Learning 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.

Department of Mathematics and Computing CDROM Set, S1 2007 (available from the USQ Bookshop). This CD contains course material, Windows and Linux Software for this and various other courses. For more information about the CD sets and their use, please refer to <http://www.sci.usq.edu.au/cdrom>.

Kruse, RL et al 1997, *Data structures and program design in C*, Prentice-Hall International, London.

Weiss, MA 1997, *Data structures and algorithm analysis in C*, 2nd edn, Addison-Wesley Longman Inc, Menlo Park, California.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	2.00
Laboratory or Practical Classes	26.00
Lectures	26.00
Private Study	107.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	10.00	10.00	30 Mar 2007 (see note 1)
ASSIGNMENT 2	10.00	10.00	27 Apr 2007
ASSIGNMENT 3	10.00	10.00	11 May 2007
ASSIGNMENT 4	10.00	10.00	25 May 2007
ASSIGNMENT 5	10.00	10.00	01 Jun 2007
2 HR CLOSED EXAMINATION	100.00	50.00	END S1 (see note 2)

### NOTES

1. Assignments 1 - 5 are due 11:59:59pm Australian Eastern Standard Time on each due date.
2. 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 satisfactorily complete an assessment item a student must achieve at least 30% of the marks. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 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 achieve at least 30% in all of the weighted assessment items, achieve at least 30% in the examination and at least 50% of the total weighted marks available for the course.
- 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 Policy, 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.
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