



The University of Southern Queensland

## Course specification

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: Discrete Mathematics for Computing

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MAT	1101	84058	3, 2008	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS003
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	010101

### STAFFING

Examiner: Harry Butler  
Moderator: Tim Passmore

### RATIONALE

Discrete methods underlie the areas of data structures, computational complexity and the analysis of algorithms. Continuing advances in technology - particularly in applications of computing - have enhanced the importance of discrete (or finite) mathematics for understanding not only the foundations of computer science but also the basis on which computational solutions to a wide variety of applications problems rests.

### SYNOPSIS

This course introduces the basic elements of discrete mathematics which provide a foundation for an understanding of algorithms and data structures used in computing. Topics covered include number systems, logic, relations, functions, induction, recursion, Boolean algebra and graph theory.

### OBJECTIVES

On successful completion of this course students will be able to:

1. demonstrate an understanding of how numeric and character data are stored in a computer (Assignment 1 and Exam);
2. demonstrate proficiency in converting simple algorithms into functional pseudo-code (Assignments 1 & 2, Exam);
3. demonstrate proficiency with symbolic logic, in mathematical reasoning and the construction of proofs (Assignments 1 & 2, Exam);
4. show familiarity with the basic notions of graphs and relationships (Exam).

## TOPICS

	Description	Weighting (%)
1.	Computer Representation of character and numeric data. Binary and hexadecimal system. ASCII code. Integer and floating point representations.	25.00
2.	Functions and Algorithms. Pseudo-code for binary/decimal and other conversions. Control structures for iteration and branching. Recursive functions.	25.00
3.	Logic and proof; digital circuits and Boolean algebra. Truth tables and the laws of logic. Logical reduction and Karnaugh maps. Quantifiers. Venn diagrams. Principle of Mathematical Induction.	25.00
4.	Graphs, Trees, Ordering and Equivalence Relationships. Eulerian and Hamiltonian graphs. Spanning trees; Kruskal's and Prim's algorithms. Expression trees. Huffman codes. Remainder arithmetic.	25.00

## 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).

Grossman, Peter 2002, *Discrete Mathematics for Computing*, 2nd edn, Palgrave MacMillan, Basingstoke, New York.

## 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.

Epp, S 1995, *Discrete Mathematics with Applications*, 2nd edn, Brooks/Cole, Pacific Grove, Ca.  
Gersting, JL 2003, *Mathematical Structures for Computer Science*, 5th edn, WH Freeman, New York.

Grimaldi, RP 2003, *Discrete and Combinatorial Mathematics: an applied introduction*, 5th edn, Addison-Wesley, Boston, Mass.

Ross, KA & Wright, CRB 2003, *Discrete Mathematics*, 5th edn, Pearson Education, Upper Saddle River, NJ.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	30.00
Examinations	2.00
Private Study	140.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	30.00	20.00	12 Dec 2008
ASSIGNMENT 2	30.00	20.00	18 Jan 2009
2HR RESTRICTED EXAMINATION	100.00	60.00	END S3 (see note 1)

### NOTES

1. Please refer to the Examination Timetable when it is published to confirm the examination date.

## 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 an assessment item satisfactorily, students must obtain at least 50% of the marks available for that assessment item.
- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without (prior) approval of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded.
- 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 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 aggregate of the weighted marks obtained for each of the summative assessment items in the course.
- 6 Examination information:  
The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators; One A4 sheet, written or typed on one or both sides with any material the student wishes to have. Students whose first language is not English, may, with the Examiner's approval, take an appropriate non-

- electronic translation dictionary into the examination. Students who wish to use a translation dictionary MUST request and receive written approval from the Examiner at least one week before the examination date. Translation dictionaries will be subject to perusal and may be removed from the candidate's possession until appropriate disciplinary action is completed if found to contain material that could give the candidate an unfair advantage.
- 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 Students must retain a copy of each assignment submitted for assessment. If requested, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request from the Examiner.
- 10 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for the examination at the scheduled time may apply to defer the assessment item. 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).
- 11 In the normal course of events students should have access to e-mail and the internet or this course. This access is assumed in the running of the course. Alternative arrangements may be made in special circumstances on request.