



Wollongong College Australia

A College of the University of Wollongong

Australia

Wollongong

ITC Education Ltd trading as
Wollongong College Australia
CRICOS 02723D
ABN 14105312329

Diploma in Information Technology

(CRICOS course codes: 057233A, 057234M)

Subject Outline Summer 2009/10

WUCT121 Discrete Mathematics

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WCA-WUCT121-S0/4

Discrete Mathematics

Subject Description

Students will be introduced to the spirit of mathematical inquiry and critical analysis, and encouraged to develop the ability to apply mathematical principles to the formulation and solution of problems. This will be done using non-calculus techniques, especially those of logic and number theory. This subject is well suited to computer science students. Topics include logic, number theory, mathematical induction, set theory, relations and functions, and graph theory.

Subject structure

Discrete Mathematics is delivered in a face-to-face format of 6 (six) hours per week. The subject consists of 2 x 2 hour lectures and 1 x 2 hour tutorial each week. The session is of 14 week's duration with face-to-face classes scheduled for the first 12 weeks and a study/examination period in Weeks 13 and 14.

Assumed Knowledge:

Band 4 or higher in NSW HSC Mathematics, or Band 2 or higher in NSW HSC Mathematics Extension 1, or any band in NSW HSC Mathematics Extension 2.

Topics:

In addition to scheduled class sessions, students are expected to spend additional time in individual study and research. As a general guideline students will need to spend at least 1 hour in private study (including completing homework and revision) for every two hours of scheduled class time.

Teachers will be available for a consultation time each week. Students will be notified of the time and location of the consultation session during Week 1 of the Session. It is recommended that students experiencing difficulty with this subject arrange to consult with the teacher as difficulties are encountered.

Some students may require tutorial support to improve language/literacy skills. Where this is recommended, students will be advised to use the College's self-access facilities in the Multimedia Centre in their own time. These facilities are located upstairs in building 30.

Calculators

Students will be required to bring a scientific calculator to all classes. Students who need to purchase a calculator for this subject are strongly recommended to purchase a Casio FX-82 series (approximately \$25 – \$40) calculator.

Only approved scientific calculators will be permitted in exams. The list of approved calculators is located on the college website (www.wca.uow.edu.au). Students should refer to this list to confirm their calculator has been approved for use in exams. Programmable calculators are not permitted. Programmable calculators usually have a RUN, EXE, CALC or SOLVE button.

Learning resources

Epp, Susanna S, 1993, *Discrete Mathematics with Applications*

Lucas, John F, 1986, *Introduction to Abstract Mathematics*

Grossman, Peter, *Discrete Mathematics*, 2nd ed, 2002, Palgrave Macmillan

Johnsonbaugh, Richard, *Discrete Mathematics*, 5th ed, 2001, Prentice Hall, New Jersey

You are not required to purchase reference books. Several copies of these books are available in the University of Wollongong Library. These readings are not intended to be an exhaustive list. Students are encouraged to use the Library catalogue and databases to locate additional readings with similar titles and contents.

Subject outcomes

Successful completion of Discrete Mathematics will enable students to:

- apply mathematical principles to the interpretation of data, the formulation and solution of problems and the critical analysis of answers for use in a range of problems in both mathematics and computer science;
- construct truth tables for logical expressions; test statements for logical equivalence and represent mathematical statements in the language of predicate logic;
- use appropriate methods of proof to derive results in set theory, number theory and the elementary theory of relations and functions;
- define the basic elements of graph theory, and apply these in analysing types of graphs.
- Define binary trees and apply them to networking.

Subject outline in weeks

The following guide to lessons and activities may be adjusted to suit the needs of the group as long as subject outcomes and assessment criteria are met.

Week 1

Lecture 1: Subject Introduction, Logic

Lecture 2: Natural Numbers

Week 2

Lecture 1: Logic

Lecture 2: Integers & Real Numbers

Week 3

Lecture 1: Logic

Lecture 2: Predicate Logic

Week 4

Lecture 1: Mathematical Induction

Lecture 2: Mathematical Induction

Assignment 1 due

Week 5

Lecture 1: Methods of Proof

Lecture 2: Number Theory

Mid-Session Test 1

Week 6

Lecture 1: Methods of Proof

Lecture 2: Number Theory

Week 7

Lecture 1: Congruence Arithmetic

Lecture 2: Number Theory

Week 8

Lecture 1: Set Theory

Lecture 2: Set Theory

Assignment 2 due

Week 9

Lecture 1: Set Theory

Lecture 2: Graph Theory

Mid-Session Test 2

Week 10

Lecture 1: Relations and Functions

Lecture 2: Graph Theory

Week 11

Lecture 1: Relations and Functions

Lecture 2: Graph Theory

Assignment 3 due

Week 12

Lecture 1: Relations and Functions

Lecture 2: Revision for Final Examination

Weeks 13 & 14 Final examination Period

Examination and study period. Please refer to examination timetable for the exact date, time and location of the final exam.

Assessment

Assessment and plagiarism policy

All written assessment tasks, with the exception of examinations and in-class tasks, must be word-processed unless students are otherwise advised.

Students must keep copies of all assessment tasks submitted for marking with the exception of class tests and examinations.

Plagiarism is a form of cheating or stealing that happens when a student uses someone else's work and presents it as his/her own without showing where it comes from. To avoid this, students are expected to submit their own original work for assessment and to accurately acknowledge all references and sources used in essays and assignments.

For information regarding assessment, plagiarism, acknowledging sources and examination rules, please refer to the Wollongong College Australia Student Handbook <http://www.wca.uow.edu.au/handbook>

Assessment Schedule

Task	Due	Weighting	Length/Time
Assignments (3)	Weeks 4, 8, 11	3 @ 5% = 15%	
Mid-Session Test 1	Week 5	20%	60 minutes
Mid-Session Test 2	Week 9	20%	60 minutes
Final Examination	Week 13/14	45%	3 hours

Note: A final mark of 50% or higher is required to pass ALL Diploma subjects.
A mark between 45% and 49% is NOT a pass.

Marking Guidelines

WCA best practice is that students can normally expect to have assessment tasks handed back within two weeks, and before the next assessment task is due. On occasion there may be exceptions to this time frame due to, for example, the size of the task, the size of the class, teacher illness or teacher leave.

Where there are several teachers marking a major assessment task, tasks will be handed back by all the teachers within the same week.

Assessment criteria and explanation of components

All assessment components are marked according to set marking criteria.

Assignments

15%

There will be three assignments which will be handed out in tutorials. Each assignment will be due as indicated in the assessment schedule. They will be marked during the ensuing week and returned in the following tutorial class. Each assignment will contribute 5% towards your final mark in WUCT121 (15% in total for all assignments).

- ▶ You must show working for each question on the assignment.
- ▶ Marking criteria includes correctness, presentation and working.
- ▶ Untidy or illegible work will not be assessed, and will be graded as 0 marks.
- ▶ Assignments must be submitted with the assignment cover sheet provided and you should make sure your receipt is initialed.
- ▶ Faxed or emailed assignments will not be accepted. You must submit your assignment in person.
- ▶ Late assignments must be dated and initialed by an authorized employee of the college and submitted in accordance with the local policy of individual campuses.
- ▶ The following penalties will apply to late assignments (in accordance with student handbook):
 - 1 day late - 10%
 - 2 days late- 20%
 - 3 days late- 30%
- ▶ Work submitted more than three days late will be graded as 0 marks.
- ▶ Extension of the due date (without penalty) will only be granted if you are successful in applying to the College for special consideration. A student requiring an extension in these circumstances should submit a Special Consideration Request Form to the Program Manager, as outlined in the Wollongong College Australia student handbook.
- ▶ Assignments are only part of the expected weekly workload.
- ▶ You should keep a copy of all work submitted.

Every assignment submitted will contribute towards your final assessment. However, the primary purpose of each assignment is to give you feedback on your progress and understanding of the work.

Mid-Session Test 1

20%

Mid-session test 1 will be held in week 5 and will examine materials covered in the lectures and tutorials during weeks 1, 2, and 3.

Mid-Session Test 2

20%

Mid-session test 2 will be held in week 9 and will examine materials covered in the lectures and tutorials during weeks 4, 5, 6, and 7.

Final Examination

45%

The final examination will be held during the formal examination period in weeks 13 and 14. The examination will include all topics covered during the session, with greater emphasis on topics studied in weeks 8 - 12.

Non-English speaking background students in the Diploma Programs may use foreign language dictionaries for their final exams. Diploma students who wish to use a dictionary must complete the Dictionary Use Application Form available at reception. This form and the dictionary must be submitted to reception **no later than 5pm Friday week 11** for approval.

Please note the following regulations regarding dictionary use:

- The only dictionaries permitted are language dictionaries, with word to word translations only.
- English-English dictionaries, Electronic dictionaries, Terminology dictionaries, or other are not permitted. The dictionary **must not** include English translations or explanations. Any dictionary that includes English explanations or phrases is not acceptable and will not be approved.