COURSE OUTLINE

MTH212 Discrete Mathematics

School: School of Science, Technology and Engineering

2025 | Semester 2

UniSC Sunshine Coast
UniSC Moreton Bay

BLENDED LEARNING — Most of your course is on campus but you may be able to do some components of this course online.

Please go to usc.edu.au for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

Discrete Mathematics embraces several topical areas of mathematics and is the study of objects and systems that assume only distinct values, such as integers. In this course, you learn how to work with mathematical reasoning to solve problems in set and number theory, logic and proofs, Boolean algebra, combinatorics, elementary probability, relations and functions, recursion, graph theory, and algorithm development as it applies to computer science.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Self-paced learning resources available from the course website.	2hrs	Week 1	13 times
Tutorial/Workshop 1 – On campus tutorial/workshops	2hrs	Week 1	13 times

1.3. Course Topics

- Introduction to logic and proofs,
- number theory, set theory and Boolean algebras,
- recursion and mathematical induction,
- theory and application of functions and relations,
- counting and probability,
- graphs and trees,
- matrix algebra and applications to graphs,
- introduction to algorithm efficiency – the big-O notation.

2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...		GRADUATE QUALITIES Completing these tasks successfully will contribute to you becoming...
1	Demonstrate a working knowledge of the important mathematical approaches to an understanding of a range of discrete systems.	Knowledgeable Empowered
2	Use a range of mathematical skills to develop logical arguments, construct proofs and solve problems in both theory and application areas like computer science.	Knowledgeable Empowered
3	Communicate important ideas and information in the language of mathematics without ambiguity.	Knowledgeable Ethical

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of "pre-requisites, co-requisites and anti-requisites".

5.1. Pre-requisites

MTH101 or MTH102 or MTH103

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MTH512

5.4. Specific assumed prior knowledge and skills (where applicable)

A foundational level of algebra is assumed, in particular skills in manipulation and rearrangement of algebraic expressions and equations.

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

Students are able to submit their problem attempts to the Discussion Board for feedback and peer review.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Artefact - Technical and Scientific, and Written Piece	Individual	25%	6 hours	Week 4	Online Submission
All	2	Artefact - Technical and Scientific, and Written Piece	Individual	25%	6 hours	Week 8	Online Submission
All	3	Examination - Centrally Scheduled	Individual	50%	135 minutes	Exam Period	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Assignment 1

GOAL:	To consolidate and develop your knowledge of mathematics as a language to solve familiar and unfamiliar problems.
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
FORMAT:	The assignment will be submitted online in a .PDF format.
CRITERIA:	

No.		Learning Outcome assessed
1	Marks are awarded for: clarity of thinking through development of problem solutions	1 2 3
2	accuracy of outcomes through appropriate use of mathematics as a language	3

GENERIC SKILLS:	Communication, Problem solving, Organisation, Information literacy

All - Assessment Task 2: Assignment 2

GOAL:	To consolidate and develop your knowledge of mathematics and its language to solve familiar and unfamiliar problems.
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
FORMAT:	Students will submit their assignment online in a .PDF format.
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstrate a working knowledge of the concepts, rules, formulae, tools and techniques specific to each topic area.	1 2
2	Use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in discrete.	2
3	Communicate using mathematical symbols and conventions.	3

GENERIC SKILLS:	Communication, Problem solving, Organisation, Information literacy

All - Assessment Task 3: Final Exam

GOAL:	To consolidate and develop your knowledge of mathematics and its language to solve familiar and unfamiliar problems covering the whole course.
PRODUCT:	Examination - Centrally Scheduled
FORMAT:	To be completed in the examination period.
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstrate a working knowledge of the concepts, rules, formulae, tools and techniques specific to each topic area.	1 2
2	Use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in discrete.	2
3	Communicate using mathematical symbols and conventions.	3

GENERIC SKILLS:	Collaboration, Problem solving, Information literacy

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Student workload is calculated at 12.5 learning hours per one unit.

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Required	Susanna Epp	0	Discrete Mathematics with Applications, Metric Edition	(5th Edition)	n/a

8.2. Specific requirements

It is recommended that you possess a good quality scientific hand-calculator. You will not require a graphics, programmable or CAS calculator for this course and these are not recommended. It is your responsibility to learn to use your calculator properly.

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%
The course is graded using the Standard Grading scale
You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate:
- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day - 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task. Weekdays and weekends are included in the calculation of days late. To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: 07 5430 1168 or using the SafeZone app. For general enquires contact the SafeUniSC team by phone 07 5456 3864 or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call 07 5430 1226 or email studentwellbeing@usc.edu.au.

10.5. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the Learning Advisers web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.6. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to Student Hub, email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.7. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, AccessAbility Services can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to Student Hub, email AccessAbility@usc.edu.au or call 07 5430 2890.

10.8. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.9. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.10. General Enquiries

In person:

- **UniSC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **UniSC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **UniSC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **UniSC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **UniSC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **UniSC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au