Xi'an Jiaotong-Liverpool University
西交利物浦大學

School of Advanced Technology

MODULE HANDBOOK

Module Code: CPT107

Module Title: Discrete Mathematics and Statistics

Prof. Ka Lok Man

Dr. Gabriela Mogos

Semester 1

2023-2024

SECTION A: Basic Information

- **Brief Introduction to the Module**

Discrete Mathematics and Statistics is an important and growing field, spanning a broad selection of topics from mathematics to engineering. This module focuses on the interface between pure mathematics and theoretical computer science. In particular, this module presents some fundamental principles of computer science, especially algebra, number and set theory, mathematical logic, combinatorics and probability. The course is suitable for students who wish to pursue research in pure mathematics. It is also suitable for students wishing to enter industry with an understanding of mathematical logical design and algorithm design.

- **Key Module Information**

Module name: *Discrete Mathematics and Statistics*

Module code: *CPT 107*

Credit value: *5*

Semester in which the module is taught: *S1*

Pre-requisites needed for the module: *None*

Programmes on which the module is shared: *BSc Information and Computing Science, and BSc Biomedical Statistics*

- **Delivery Schedule**

Lecture room: *SC176 (Week 1-3, 4-13)*

Lecture time: *Friday, 2-4 pm*

Tutorial times: *Friday, 4-6 pm*

- **Module Leader and Contact Details**

Name: *Prof. Ka Lok Man*

Brief Biography: *Ka Lok Man holds a Dr. Eng. Degree in Electronic Engineering from Politecnico di Torino, Italy, and a PhD in Computer Science from Technische Universiteit Eindhoven, The Netherlands. He has several years of industrial experience in integrated circuit design. He has a good publication record and to date has more than 500 published academic articles including books, edited books, journal articles, book chapters, and conference proceedings.*

Email address: *ka.man@xjtlu.edu.cn*

Office telephone number: *0512-8816-1509*

Room number and office hours: *SD437; Monday and Friday: 1-2pm*

Preferred means of contact: *e-mail*

- **Additional Teaching Staff and Contact Details**

Name: *Dr. Gabriela Mogos*

Email address: Gabriela.Mogos@xjtlu.edu.cn

Brief Biography: *Refer to XJTLU webpage.*

Office telephone number: *0512-8816-1515*

Room number and office hours: *SD547; Monday and Friday: 1-2pm*

Preferred means of contact: *email*

SECTION B: What you can expect from the module

❑ Educational Aims of the Module

The educational aims of the module are as follows:

1. *to introduce the notation, terminology, and techniques underpinning the discipline of Theoretical Computer Science;*
2. *to provide the mathematical foundation necessary for understanding datatypes as they arise in Computer Science and for understanding computation;*
3. *to introduce the basic proof techniques which are used for reasoning about data and computation;*
4. *to introduce the basic mathematical tools needed for specifying requirements and programs, and for analysing algorithms.*

❑ Learning Outcomes

On successful completion of this module, students are expected to:

1. *reason about simple datatypes using basic proof techniques;*
2. *interpret set theory notation, perform operations on sets, and reason about sets;*
3. *understand, manipulate and reason about unary relations, binary relations, and functions;*
4. *represent statements in propositional logic and first-order predicate logic and to recognise, understand, and reason about formulas in propositional logic and first-order predicate logic;*
5. *apply basic counting and enumeration methods as these arise in analysing permutations and combinations;*
6. *perform simple calculation about discrete probability.*

❑ Assessment Details

Initial Assessment

Sequence	Assessment Type(EXAM or CW)	Method	Learning outcomes assessed *(use codes under Learning Outcomes)*	Duration[3]	% of Final Mark	Resit(Y/N/S)[4]
001	EXAM	Written Examination	ALL	2 hours	80	S
002	CW	Cousework	1-3		10	S
003	CW	Cousework	4-6		10	S

Resit Assessment

Assessment Type (EXAM or CW)[5]	Learning outcomes assessed *(use codes under Learning Outcomes)*	Duration	% of Final Mark
EXAM		2 hours	100

The resit assessment will assess all of the learning outcomes of the module, and will be weighted as 100% of the final module mark. Other components of the assessment, regardless of whether or not the student passed or failed, will not be included in the calculation of the final module mark, following resit assessment.

❑ Methods of Learning and Teaching

Formal lectures/Tutorials: Students will be expected to attend two hours of formal lectures and two hours of tutorial in a typical week. Private study: In a typical week, students will be expected to devote a further seven or eight hours of unsupervised time to private study. The time allowed for private study each week will typically include four hours of time for reflection and consideration of lecture material, and three to four hours of background reading.

❑ Syllabus & Teaching Plan

Week Number and/or Date	Lecture/Seminar/ Field Trip/Other	Topic/Theme/Title	Pre-reading
Week 1-2	*Lecture 1-2*	*Number systems and proof techniques*	*ppt available on LM on the same week*
Week 3-4	*Lecture 3-4*	*Set theory and Relations*	*ppt available on LM on the same week*
Week 5-6	*Lecture 5-6*	*Functions*	*ppt available on LM on the same week*
Week 8-9	*Lecture 7-8*	*Logic*	*ppt available on LM on the same week*
Week 10-11	*Lecture 9-10*	*Combinatorics*	*ppt available on LM on the same week*
Week 12-13	*Lecture 11-12*	*Probability*	*ppt available on LM on the same week*

❑ Tutorial Schedule

Student Group	Time	Day	Venue	Lecturer/Instructor
All students	*4-6pm*	*Friday*	*SC176*	*Prof. Ka Lok Man* *Dr. Gabriela Mogos*

❑ Reading Materials

Reference textbooks:

1. *Logic in Computer Science, Michael Huth & Mark Ryan, Cambridge*
2. *Discrete Mathematics for Computing, R. Haggarty, Addisonwesley*

SECTION C: Additional Information

- **Student Feedback**

  The University is keen to elicit student feedback to make improvements for each module in every session. It is the University policy that the preferred way of achieving this is by means of an online Student Module Feedback Questionnaire. Students will be invited to complete the questionnaire survey for this module at the end of the semester.

  You are strongly advised to read the policies mentioned below very carefully, which will help you better perform in your academic studies. All the policies and regulations related to your academic study can be found in 'Assessment and Examination' section under the heading "Policies and Regulations" on E-bridge.

- **Plagiarism, Cheating, and Fabrication of Data.**

  Offences of this type can result in attendance at a University-level committee and penalties being imposed. You need to be familiar with the rules. Please see the "Academic Integrity Policy" available on e-Bridge in the 'Assessment and Examination' section under the heading 'Policies and Regulations'.

- **Rules of submission for assessed coursework**

  The University has detailed rules and procedures governing the submission of assessed coursework. You need to be familiar with them. Details can be found in the "Code of Practice for Assessment" available on e-Bridge in the 'Assessment and Examination' section under the heading 'Policies and Regulations'.

- **Late Submission of Assessed Coursework**

  The University attaches penalties to the late submission of assessed coursework. You need to be familiar with the University's rules. Details can be found in the "Code of Practice for Assessment" available on e-Bridge in the 'Assessment and Examination' section under the heading 'Policies and Regulations'.

- **Mitigating Circumstances**

  The University is able to take into account mitigating circumstances, such as illness or personal circumstances which may have adversely affected student performance on a module. It is the student's responsibility to keep their Academic Advisor, Development Advisor, Programme Director, or Head of Department informed of illness and other factors affecting their progress during the year and especially during the examination period. Students who believe that their performance on an examination or assessed coursework may have been impaired

by illness, or other exceptional circumstances should follow the procedures set out in the “Mitigating Circumstances Policy”, which can be found on e-Bridge in the ‘Assessment and Examination’ section under the heading ‘Policies and Regulations’.

- **Learning Mall Core**
  Copies of lecture notes and other materials are available electronically through XJTLU Learning Mall Core, the University’s virtual learning environment at: https://sso.xjtlu.edu.cn/login.