H6DISMTHS: Discrete Mathematics

Module Code:	H6DISMTHS
Long Title	Discrete Mathematics APPROVED
Title	Discrete Mathematics
Module Level:	LEVEL 6
EQF Level:	5
EHEA Level:	Short Cycle
Credits:	5
Module Coordinator:	MICHAEL BRADFORD
Module Author:	MICHAEL BRADFORD
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Master's degree in mathematics, computing or cognate discipline. May have industry experience also.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
LO1	Construct logical mathematical arguments and proofs.
LO2	Apply set algebra and logic operations to demonstrate problem solving and mathematical reasoning capabilities.
LO3	Associate the rules of sets and operations to the areas of Relations and Functions.
LO4	Construct and investigate a range of functions and describe their representations.
LO5	Apply set theoretical concepts and methods of counting to solve combinatorial problems.
LO6	Apply graph theory concepts to represent a set of finite objects and their inter-relationships.

Dependencies

Module Recommendations

No recommendations listed

Co-requisite Modules

No Co-requisite modules listed

Entry requirements	See section 4.2 Entry procedures and criteria for the programme including procedures recognition of prior learning

H6DISMTHS: Discrete Mathematics

Module Content & Assessment

Indicative Content
Logic & Proof Propositional Logic. Boolean Operators. Truth Tables. Boolean Expressions
Logic & Proof Predicates and Quantifiers. Methods of Mathematical Proof
Set Theory Naïve Set Theory. Finite and infinite sets. Set Operations
Set Theory Partitions . Product Set and Power Set
Relations & Functions Binary Relations. Properties of Relations. Equivalence Relations .
Relations & Functions Partial Orders. Properties of Functions. Composition of Functions. Inverse Functions
Recurrence Relations & Generating Functions Polynomials. Ordinary and Exponential Generating Functions
Recurrence Relations & Generating Functions Sequences and Recurrence Relations. Solution of Recurrence Relations. Linear Homogeneous Recurrence Relations. Linear Non-Homogeneous Recurrence Relations
Combinatorics The Sum Rule and the Product Rule. The Pigeonhole Principle. The Inclusion-Exclusion Principle
Combinatorics The Factorial Function. Permutations and Combinations
Graph Theory Definition and Examples. Directed Graphs. Walks, Trails, Paths, Circuits, and Cycles
Graph Theory Trees. Planar Graphs. Colouring and Matching Graphs.

Assessment Breakdown	%
Coursework	40.00%
End of Module Assessment	60.00%

Assessments

Full Time

Coursework

Assessment Type:	Formative Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4,5,6
Non-Marked:	Yes		

Assessment Description:
Ongoing independent and group class activities and feedback.

Assessment Type:	Continuous Assessment	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4,5
Non-Marked:	No		

Assessment Description:
A set of questions relating to Logic, Set Theory, Relations & Functions, and Recurrence Relations & Generating Functions, and Combinatorics.

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	60
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3,4,5,6
Non-Marked:	No		

Assessment Description:
Written examination with questions from all module topic areas.

No Workplace Assessment

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

Reassessment Description
The repeat strategy for this module is an examination. All learning outcomes will be assessed in the repeat exam.

H6DISMTHS: Discrete Mathematics

Module Workload

Module Target Workload Hours 0 Hours

Workload: Full Time

Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Classroom & Demonstrations (hours)	24	Per Semester	2.00
Tutorial	Other hours (Practical/Tutorial)	36	Per Semester	3.00
Independent Learning	Independent learning (hours)	65	Per Semester	5.42
			Total Weekly Contact Hours	5.00

Workload: Part Time

Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	No Description	24	Every Week	24.00
Tutorial	No Description	36	Every Week	36.00
Independent Learning	No Description	65	Every Week	65.00
			Total Weekly Contact Hours	60.00

Module Resources

Recommended Book Resources

Ferland K.. (2017), Discrete Mathematics and Applications (2nd ed), Chapman and Hall/CRC.

Kenneth H. Rosen. (2018), Discrete Mathematics and Its Applications, 8th Edition. McGraw-Hill Education, [ISBN: 978-1260091991].

Supplementary Book Resources

Oscar Levin. (2016), Discrete Mathematics, Createspace Independent Publishing Platform, p.342, [ISBN: 978-1534970748].

Jonathan L. Gross,Jay Yellen,Mark Anderson. (2018), Graph Theory and Its Applications, Chapman & Hall/CRC, p.577, [ISBN: 978-1482249484].

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note:	