

Macao Polytechnic Institute
School of Applied Sciences
Bachelor of Science in Computing
Course Syllabus
Academic Year 2019/2020 Semester 2

Course Title	Discrete Mathematics			Course Code	MATH121
Pre-requisite Course	MATH111 Essential Computer Mathematics				
Language of Instruction	English			Credit	3
Course Duration (Theory)	45 hrs	Course Duration (Practice)	0 hrs	Total Course Duration	45 hrs
Teacher(s) / Title	Dr. L. W. Yip		E-mail	lwyip@ipm.edu.mo	
Office	Rm.M501, Meng Tak Bldg.		Telephone	8599-3262	

Course Description:

This course is designed for computer studies programme students to enhance their training in logical thinking through a variety of mathematical topics. Topics include sets and logic, combinatorial mathematics, relations and functions, groups, and graphs.

Learning Outcomes:

After completing the course, students will be able to:

1. Describe sets using the descriptive property method; (SM2p)
2. Analyze a logical proposition; (SM2p)
3. Apply some powerful mathematical tools, viz. Principle of Inclusion and Exclusion, Principle of Mathematical Induction, Multiplication Principle for Counting, and the Pigeonhole Principle in solving some mathematical problems; (SM2p, EA3p)
4. Explain the abstract concept of relations, especially that of equivalence relations; (SM2p)
5. Explain the abstract concept of algebraic systems, especially that of groups; (SM2p)
6. Formulate and solve mathematics-related problems arising from the computer courses. (SM2p, SM3p)

Content:

1. Sets (9 hours)
 - 1.1. Basic Concepts of Sets
 - 1.2. Operations of Sets
 - 1.3. Properties of Set Operations
 - 1.4. Principle of Inclusion and Exclusion
2. Simple Mathematical Logic (7 hours)
 - 2.1. Propositions
 - 2.2. Logical Operations
 - 2.3. Quantified Propositions
 - 2.4. Mathematical Induction
3. Counting (8 hours)
 - 3.1. Basic Counting Principles
 - 3.2. Permutations
 - 3.3. Permutations with Repetition
 - 3.4. Combinations
 - 3.5. Pigeonhole Principle
4. Relations and Functions (10 hours)
 - 4.1. Cartesian Products and Partitions
 - 4.2. Relations
 - 4.3. Graphical Representation of Relations
 - 4.4. Equivalence Relations
 - 4.5. Functions
 - 4.6. Injections and Surjections
5. Groups (11 hours)
 - 5.1. Binary Operations
 - 5.2. Closed Algebraic Systems
 - 5.3. Semigroups
 - 5.4. Monoids
 - 5.5. Groups and Subgroups

Teaching Method:

Lectures and tutorials.

Attendance:

Attendance requirements are governed by the Academic Regulations. Students who do not meet the attendance requirements for the course will not be permitted to sit the final and re-sit examination and shall be awarded an 'F' grade.

Assessment:

This course is graded on a 100 point scale, with 100 being the highest possible score and 50 the pass score.

Item	Description	AHEP3 LO	Percentage
1 Assignments/Classwork	Home- / Classroom-based exercises	SM2p, SM3p, EA3p	10%
2 Tests	Knowledge assessment	SM2p, SM3p, EA3p	40%
3 Examination	3-hour written examination	SM2p, SM3p, EA3p	50%
Total Percentage:			100%

Students with an overall score of less than 35 in the coursework must take the re-sit examination even if the overall score for the course is 50 or above.

Students with a score of less than 35 in the final examination must take the re-sit examination even if the overall score for the course is 50 or above.

Students with an overall final grade of less than 35 are NOT allowed to take the re-sit examination.

Teaching Material(s):

Textbook(s)

1. Kolman, B., Busby, R. C., and Ross, S. C. (2008). *Discrete Mathematical Structures* (6th ed.). New York: Prentice Hall.

Reference:

Reference book(s)

1. Rosen, K. H. (1998). *Discrete Mathematics and Its Applications*. Singapore: McGraw-Hill.