

**Macao Polytechnic University**  
**Faculty of Applied Sciences**  
**Bachelor of Science in Computing**  
**Module Outline**  
**Academic Year 2022 / 2023 Semester 1**

<b>Learning Module</b>	Essential Computer Mathematics		<b>Class Code</b>	MATH111
<b>Pre-requisite(s)</b>	Nil			
<b>Medium of Instruction</b>	English		<b>Credit</b>	3
<b>Lecture Hours</b>	45 hrs	<b>Lab/Practice Hours</b>	0 hrs	<b>Total Hours</b> 45 hrs
<b>Instructor</b>	Dr. Charles Lam		<b>E-mail</b>	cklamsta@mpu.edu.mo
<b>Office</b>	Rm.N46B, Wui Chi Building., Main Campus		<b>Telephone</b>	8599-6823

**Description**

This module is an introduction to mathematical topics related to computer and information sciences. Topics include exponents and radicals, sequences and series, sets, functions, limits, continuity, matrices, binary number system, octal number system, hexadecimal number system, computer arithmetic, Boolean algebra and logic gates, and minimization of logic circuits.

**Learning Outcomes**

After completing the learning module, students will be able to:

1. Summarize the fundamentals in algebra including exponents and radicals, sequences and series; (SM2p, EA3p)
2. Explain set operations; (SM2p, EA3p)
3. Classify and manipulate with functions; (SM2p, EA3p)
4. Show matrix computations; (SM2p, EA3p)
5. Explain the numerical and computational concepts and procedures among different number systems (binary, octal, decimal, hexadecimal); (SM2p, EA3p)
6. Draw electronic circuit using logical gates and simplify electronic circuits using Karnaugh maps. (D4p)

## **Content**

1. Review of Algebra (3 hours)
  - 1.1 Real number system
  - 1.2 Exponents and radicals
  - 1.3 Sequences and series
2. Sets (4.5 hours)
  - 2.1 Special sets
  - 2.2 Venn diagrams
  - 2.3 Set operations
3. Mathematical Functions (6 hours)
  - 3.1 Domain and range
  - 3.2 Types of functions
  - 3.3 Limits and Continuity
  - 3.4 Graphical representation of functions
4. Matrix Algebra (4.5 hours)
  - 4.1 Matrix operations
  - 4.2 Determinant
  - 4.3 Inverse
5. Binary Number System (6 hours)
  - 5.1 Decimal and binary systems
  - 5.2 Binary operations
  - 5.3 Complements
6. Octal and Hexadecimal Number Systems (6 hours)
  - 6.1 Number systems
  - 6.2 Octal system
  - 6.3 Hexadecimal system
7. Computer Arithmetic (6 hours)
  - 7.1 Exponential form
  - 7.2 Internal representation
  - 7.3 Computer arithmetic
8. Boolean Algebra and Logic Gates (4.5 hours)
  - 8.1 Boolean algebra
  - 8.2 Basic theorems
  - 8.3 Boolean expressions
  - 8.4 Logic gates and circuits
9. Minimization of Logic Circuits (4.5 hours)
  - 9.1 Minimal boolean expressions
  - 9.2 Karnaugh maps

## **Teaching Method**

Lectures and tutorials

## **Attendance**

Attendance requirements are governed by the “Academic Regulations Governing Bachelor’s Degree Programmes” of Macao Polytechnic University. Students who do not meet the attendance requirements for the module will not be permitted to sit the final or re-sit examination and shall be awarded an ‘F’ grade.

## **Assessment**

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 being the passing score.

<b>Item</b>	<b>Description</b>	<b>AHEP3 LO</b>	<b>Percentage</b>
1. Assignments / Classwork	Home- / Classroom-based exercises	SM2p, EA3p, D4p	10%
2. Tests	Knowledge assessment	SM2p, EA3p, D4p	40%
3. Examination	3-hour written examination	SM2p, EA3p, D4p	50%
<b>Total Percentage:</b>			<b>100%</b>

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 module 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 module 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**

### **Textbook(s)**

There is no official text for this module. Module notes are distributed in the class.

## **Reference**

### **Reference book(s)**

1. Cook, N. (2003). *Introductory Computer Mathematics* (2<sup>nd</sup> ed.). Pearson Education.
2. Lipschutz, S. (1987). *Essential Computer Mathematics*. McGraw-Hill.