

**HOSTOS COMMUNITY COLLEGE  
DEPARTMENT OF MATHEMATICS**

**MAT 100**                      **Introduction to College Mathematics I**

**CREDIT HOURS:**        **3.0**

**EQUATED HOURS:**    **3.0**

**CLASS HOURS:**        **3.0**

**PREREQUISITE:**        **Passing score on the COMPASS/CMAT**

**REQUIRED TEXTS:**    **Angel, Abbott, Runde, A Survey of Mathematics with Applications (2012), 9<sup>th</sup> Edition. ISBN13:9780321759665**

**DESCRIPTION:**        **This course provides skills in finite mathematics. Topics: set theory, symbolic logic, systems of numeration, and the metric system.**

**EXAMINATIONS:**     **A minimum of four partial tests (suggested 15% each) and a comprehensive departmental final examination (suggested 40%).**

**GRADES:**                **A, A<sup>-</sup>, B<sup>+</sup>, B, B<sup>-</sup>, C<sup>+</sup>, C, D, I, F.**

**LEARNING OUTCOMES FOR MAT 100:**

**The main aim of student learning outcome is to understand the following Mathematical concepts. In order to reach these understanding, students will:**

1. Interpret and draw appropriate inferences from quantitative and qualitative representations, such as Venn diagrams, truth tables etc.
2. Use numerical and statistical methods as well techniques from probabilities and number theory to draw accurate conclusions and solve mathematical problems.
3. Represent quantitative problems expressed in natural language in a suitable mathematical format such as use of Venn diagrams, logical statements, measure of center, spread or variation, system of numeration in base 10 and

operation of bases other than 10.

4. Effectively communicate quantitative analysis or solutions to mathematical problems in written form such as set theory notation, Venn diagrams, logic statements, DeMorgan's law of sets and DeMorgan's law of logic.
5. Evaluate solutions to problems for reasonableness. Recognize patterns and use these patterns for predicting the general term in a sequence.
6. Apply mathematical methods to problems in other fields of study including Economic, Computer Science, Statistics, Modular number theory and Probabilities.

## MAT 100

### COURSE OUTLINE

- I. SEQUENCES OF REAL NUMBERS
  1. Arithmetical Progressions
  2. Multi-level Arithmetical Progressions
  3. Geometrical Progression
  4. Harmonic Progressions
- II. BASIC DEFINITIONS AND PROPERTIES OF SET:
  1. Define set, subset, proper subset, empty set, universal set
  2. Describe sets by rule and roster
  3. Define complement of a set
  4. Find the number of subsets that can be formed from an indefinite set
  5. Identify equivalent sets
  6. Classify sets as finite or infinite
- III. RELATIONSHIPS BETWEEN SETS:
  1. Define and find the intersection of sets
  2. Define and find the union of sets
- IV. SETS OF POINTS:
  1. Draw Venn diagrams illustrating the union of sets
  2. Draw Venn diagrams illustrating the intersection of sets
  3. Use Venn diagrams to show that two sets are equal

- V. BASIC DEFINITIONS AND PROPERTIES OF SETS:
1. Classify numbers as ordinal, or cardinal
  2. Construct a one-to-one correspondence between the elements of two sets

**EXAM 1 (Suggested 15%)**

- VI. LOGICAL STATEMENTS:
1. Translate English statements into symbolic form
  2. Write the negation, conjunction and disjunction of given statements
  3. Write the converse, inverse and contrapositive of given statements

- VII. TRUTH TABLE:
1. Give a truth value to a given compound statement
  2. State whether or not two given statements are equivalent.
  2. Determine whether or not a given statement is a tautology.

**EXAM 2 (Suggested 15%)**

- VIII. PROBABILITY
1. Find the probability of an event such as: Rolling a dice, Picking a card from a random deck or tossing a coin.
  2. Describe the sample space of a probability experiment.
  3. Find the probability of two events occurring that are mutually exclusive
  4. Find the probability of two events occurring that are not mutually exclusive.

- IX. NUMBERS AND NUMERALS:
1. Define number and numeral
  2. Write Roman (Egyptian) numerals
  3. Compute in the Roman (Egyptian) system of numeration

- X. PLACE VALUE IN THE DECIMAL SYSTEM:
1. Write numbers in expanded notation
  2. Write numbers in the decimal notation

- XI. OTHER BASES:
1. Discover other systems of notation
  2. Write numbers in other bases
  3. Translate numbers from base 10 to base x
  4. Translate numbers from base x to base 10

- XII. OPERATION IN OTHER BASES:
1. Perform addition in bases 2, 5 and 12
  2. Perform addition in bases 2, 5 and 12
  3. Perform multiplication in bases 2, 5 and 12
  4. Perform division in bases 2, 5 and 12

**EXAM 3 (Suggested 15%)**

XIII. MOLULAR ARITHMETIC:

1. Add and subtract on a 12-hour clock
2. Multiply and divide on a 12-hour clock
3. Compute in arithmetic modulo 5
4. Compute in arithmetic modulo 10

XIV. FACTORIZATION AND PRIME NUMBERS:

1. Find the factors of any counting numbers
2. Distinguish between prime and composite number
3. Find the prime factorization of any counting number

XV. THE METRIC SYSTEM:

1. Units of measure in the metric system
2. Conversion of measurements within the metric system
3. Conversion between the Metric and English systems

**EXAM 4 (Suggested 15%)**

**FINAL EXAM (Suggested 40%)**