

## WTCS Repository

# 10-804-133 Mathematics and Logic

## Course Outcome Summary

### Course Information

**Description** Students will apply problem solving techniques from discrete mathematics. Topics include symbolic logic, sets, algebra and base number systems.

**Total Credits** 3.00

### Pre/Corequisites

**Prerequisite** Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

Recommended Prerequisite Skills: Working knowledge of algebra (Pre-Algebra or Elementary Algebra)

### Course Competencies

#### 1. Solve applied algebraic problems

##### Assessment Strategies

1.1. Oral, Written or Graphic Assessment

##### Criteria

- 1.1. you simplify algebraic expressions
- 1.2. you solve algebraic equations
- 1.3. you represent or interpret the applied problems algebraically
- 1.4. you illustrate the solutions mathematically using charts, graphs, diagrams etc.

#### 2. Utilize heuristic tools for problem solving

##### Assessment Strategies

2.1. Oral, Written or Graphic Assessment

##### Criteria

- 2.1. you differentiate among heuristic tools (examples may include draw a diagram, make a list, eliminate possibilities, look for sub-problems, work backwards, etc.)
- 2.2. you identify the root of the problem
- 2.3. you justify choice of heuristics when solving problems
- 2.4. you apply the heuristics to the problem
- 2.5. you solve the problem
- 2.6. you document the process you used to solve the problem

#### 3. Convert between place value number systems

##### Assessment Strategies

3.1. Oral, Written or Graphic Assessment

**Criteria**

- 3.1. you convert from base N to decimal
- 3.2. you convert from decimal to base N
- 3.3. you convert between computer number systems (binary, octal and hexadecimal)

**4. Apply number systems to problem solving****Assessment Strategies**

- 4.1. Oral, Written or Graphic Assessment

**Criteria**

- 4.1. you differentiate among different number systems
- 4.2. you analyze the root of the problem
- 4.3. you justify the choice of the number system for solving the problem
- 4.4. you apply the number system to solving the problem
- 4.5. you solve the problem
- 4.6. you document the process you used to solve the problem

**5. Apply principles of set theory****Assessment Strategies**

- 5.1. Oral, Written or Graphic Assessment

**Criteria**

- 5.1. you use set theory notation
- 5.2. you use appropriate set terminology
- 5.3. you apply set properties to solve problems
- 5.4. you apply the concept of cardinality
- 5.5. you draw a Venn diagram
- 5.6. you use Venn diagram to solve problems
- 5.7. you document the process you use to solve the problem

**6. Apply symbolic logic principles****Assessment Strategies**

- 6.1. Oral, Written or Graphic Assessment

**Criteria**

- 6.1. you differentiate among logical operators ( i.e. and, or, x-or, and not)
- 6.2. you differentiate between conditional and biconditional using various logical methods (i.e. truth table, matrix logic, Boolean algebra, etc.)
- 6.3. you apply logic methods to solve problems
- 6.4. you verify the solution to the problem