

Course Description

Puzzles and Problem Solving:

Do you like playing games and solving puzzles? Come learn about the mathematics and logic behind SET, Nims, Magic Squares, and Tower of Hanoi. While they are often used for fun and games, there are a lot of connections between these games and puzzles and the mathematics used to solve complex real world problems. In this course, put your puzzle solving skills to the test in an interactive and hands-on day of fun!

Syllabus

Course Objectives:

- Acquire new mathematical skills applicable to games and puzzles.
- Analyze the mathematics behind various games and puzzles.
- Explore combinatorics and probability in both informally and rigorously.

Assignments and Evaluation:

- Problem Solving - Solve problems involving combinatorics and probability.
- Discussions - Class discussions about the mathematics behind SET, Nims, Magic Squares, and Tower of Hanoi.

Course Outline:

- Third Person Introductions
- Icebreaker: Human Machine
- Rules and Expectations
- Warm Up: Bridge Riddle
- Game of Sets
 - Rules
 - Example
 - Play at Table
 - Probability Problems
- Brain Teaser: Number Puzzle
- Restroom Break
- Brain Teaser: Frog Riddle
- Nims
 - Rules
 - 1 pile Nims
 - 2 pile Nims
 - Discussion of Strategies
 - Counting Problems
- Brain Teaser: Pigeonhole Principle
- Lunch
- Warm Up: Monty Hall Problem
- Magic Squares
 - What is a Magic Square?
 - 1 by 1
 - 2 by 2
 - 3 by 3 and 4 by 4
 - Discussion of Strategies
 - Find Error

- Ben Franklin's Magic Square
- Brain Teaser: Bicycles and Tricycles
- Restroom/Snack Break
- Brain Teaser: Temple Riddle
- Towers of Hanoi
 - Rules
 - 1 and 2 disks
 - Table: 3, 4, 5, and 6 disks
 - 10 and 2^n disks
 - Monks
- Brain Teaser: Handshake Problem
- Evaluations and Certificates