

 COMPUTER SCIENCE
 DEPARTMENT

CS 130 - STUDENT LEARNING OUTCOMES

**Apply mathematical induction and other techniques to prove mathematical results.**

* Below Expectations: Recognizes valid proofs that use mathematical induction and other techniques.
* Meets Expectations: Given a simple problem, such as an identity, constructs a mathematical proof by induction.
* Exceeds Expectations: Constructs mathematical proofs by induction and other techniques.

**Examine the logical validity of arguments and proofs as they apply to Boolean exp**ressions.

* Below Expectations: Identifies the properties and structures of Boolean algebra.
* Meets Expectations: Analyzes the steps to simplify a Boolean expression.
* Exceeds Expectations: Constructs a proof using the laws of Boolean algebra.

**Illustrate the basic terminology and properties of graphs and trees.**

* Below Expectations: Defines terms and properties for graphs and trees.
* Meets Expectations: Given a problem description illustrates appropriate trees, binary search trees, weighted, directed and undirected graphs solutions.
* Exceeds Expectations: Applies mathematical proofs to verify the properties of graphs.

**Perform binary and hexadecimal conversions of numbers**.

* Below Expectations: Converts binary numbers to their decimal equivalent.
* Meets Expectations: Converts positive numbers between bases 2, 10, and 16.
* Exceeds Expectations: Performs twos complement to represent negative integers in binary.

**Perform computations using recursively defined functions and structures.**

* Below Expectations: Explains how a simple recursive function is evaluated.
* Meets Expectations: Computes the correct result produced by a recursive algorithm.
* Exceeds Expectations: Constructs recursive algorithms for the solution of problems.

**Solve problems involving sets, relations, functions, and congruencies.**

* Below Expectations: Defines the concepts of sets, relations, functions, and congruencies.
* Meets Expectations: Solves problems about sets, relations, functions, and congruencies.
* Exceeds Expectations: Evaluates a problem and constructs an appropriate solution choosing among sets, relations, functions, and/or congruencies.

**Use graphs and trees to solve problems algorithmically.**

* Below Expectations: Explains standard algorithms for graphs and trees, such as Eulerian circuits, spanning trees, and Kruskals algorithm.
* Meets Expectations: Applies traversal methods for graphs and trees.
* Exceeds Expectations: Verifies the correctness of graph algorithms using mathematical proofs.

**Use methods of combinatorics to solve counting problems.**

* Below Expectations: Recognizes the need for combinatorial techniques such as combinations or permutations to solve a problem.
* Meets Solves counting problems using combinatorial techniques such as combinations and permutations.
* Exceeds Expectations: Decomposes a complex problem into combinatorial procedures.