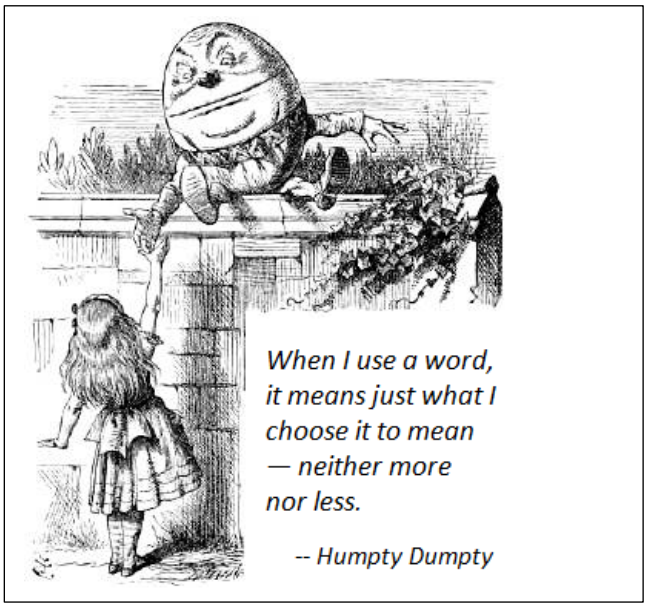
ECS017
Data, Logic, and Computing

Instructor: Patrice Koehl



Winter 2022:

ECS 017 A01 (CRN: 45669)
Lecture MWF 10-10:50; Veihmeyer 212
Discussion M 11-11:50; Bainer 1060

ECS 017 A02 (CRN: 45670)
Lecture MWF 10-10:50; Veihmeyer 212
Discussion W 11-11:50; Bainer 1130

Description

Display, processing, and representation of information and data on a computer. Understanding and analyzing the digital representations of numbers, images, and sounds. Basic computer operations and their logic. Introduction to discrete mathematics in computer science, including propositional logic, proofs by induction, recursions, and counting. Introduction to algorithms. Uses of computers and their influence on society. ***GE: SE, QL.***

Prerequisites

MAT 016A or MAT 017A or MAT 021A (can be concurrent)

Credit Limitation

Not open for credit to students who have completed course ECS 20 or MAT108.

Expanded Course Description

1. ***Going Digital: Representing different types of information in a computer***
    a. Representations of numbers: from integers and real numbers to binary formats
    b. Analogue vs digital signal. Sampling and discretization
    c. Representing music, pictures, and movies in a computer
    d. Computer hardware: processors, interfaces, storage
    e. Basic principles of computer operations
2. ***The logic behind computing***
    a. Propositional and first order logic
    b. Basic set theory
    c. Methods of proof. Induction and recursion. Inductive definitions.
    d. Combinatorics and counting. Permutations, combinations. The Pigeonhole principle.
3. ***Introduction to Algorithms by examples***
    a. Program design
    b. Algorithms: correctness and complexity
    c. Basic algorithms: sorting and searching
4. ***Ethical issues: computer and society***
    a. Data collection and privacy