

COURSE DESCRIPTION

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| Course No. | CSC250 | Course Title | Foundations of Computer Science I |
| Course Type | Required | | |
| Sem. Hours | 3 | Coordinator | Mark Armstrong |

Current Catalog Description:

An introduction to the fundamental ideas underlying contemporary computer science with a focus on the computation and construction of objects.

Textbook:

Discrete Mathematics, 5th edition (2003), Kenneth A. Ross & Charles R. B. Wright, Prentice Hall

References:

None

Course Outcomes:

Upon successful completion of this course, a student should be able to:

1. *recognize* the tools and techniques that are necessary to practice the art and science of computing
2. *select* suitable techniques to prove statements
3. *describe* the main ideas covered in each topic
4. *use* knowledge of and *solve* problems related to discrete structures, logic, and computability
5. *analyze* algorithms

Activities Enabling Program Outcomes (POx refers to program student outcome x):

Instruction: The core of this course involves exploration of discrete structures and mathematical concepts important for computer scientist. They involve sets, sequences, functions, logic, proofs, relations, induction, recursion, algorithm analysis, and counting. Each concept is introduced through formal definition and real-world examples. Problems are presented with focus on choosing appropriate techniques (POa), modeling real-world problems (POa), utilizing correct terminology in describing the model and its solution (POa), calculating correct solutions (POa), and analyzing solutions (POa).

Student Activities and Assessment: Based on instruction, every offering of this course will include (details of assessment criteria and expectations are in outcome rubrics):

1. At least one assignment or test question where the student must choose the appropriate technique to solve a counting problem (POa)
2. At least one assignment or test question where the student must choose an appropriate proof technique and use the technique to provide a formal proof (POa)
3. At least one assignment or test question where the student must demonstrate an understanding of properties of relations (POa)
4. At least one assignment or test question where the student must complete an inductive proof (POa)
5. At least one assignment or test question where the student must analyze the runtime of an algorithm generating and proving big-Oh (POa)
6. At least one assignment or test question where the student must find a closed-form for a given recursion (POa)

Prerequisites by Topic:

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| Students must have <ul style="list-style-type: none"> • a grade of at least C (2.0) in CSC 130, or • permission of instructor. |
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Major Topics Covered in the Course:

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| <ul style="list-style-type: none"> • Sets, Sequences, and Functions • Elementary Logic – Proofs • Relations • Induction and Recursion – Algorithm Analysis • Counting |
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Estimated Curriculum Category Content (Semester hours):

| <i>Area</i> | <i>Core</i> | <i>Advanced</i> | <i>Area</i> | <i>Core</i> | <i>Advanced</i> |
|----------------------------|-------------|-----------------|------------------------|-------------|-----------------|
| Algorithms | 1.5 | 0 | Software design | .25 | 0 |
| Data structures | 1.25 | 0 | Prog. Languages | 0 | 0 |
| Comp Org & Arch | 0 | 0 | | | |