

## Certificate

# Computer Science for Teachers Certificate

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The purpose of this certificate is to educate students in foundational and advanced aspects of computing. Students will gain knowledge in algorithm design and analysis, relational databases, and advanced topics in computer science. Students will develop skills in analyzing algorithm complexity and designing SQL relational databases. Coursework will provide students with discipline specific content needed to teach college-level coursework in computer science. Graduates will be able to understand and discuss foundational computing topics and database architecture and modeling.

The primary target audience is licensed high school teachers in computer science or a related subject, who hold a master's degree in another field. Students enrolled in master's degree programs at Old Dominion University with a background in math or computer science will also be targeted.

Full-time and part-time students may enroll in the certificate program. Both non-degree seeking and degree seeking students may enroll. Degree seeking students may take courses in conjunction with their regular course load.

The courses in this certificate are available both in a traditional face-to-face format and fully online.

## Admission

All students will be required to apply to the certificate program. The admission requirements will be based on enrollment status at the institution.

Degree-seeking students will:

- Gain advisor approval before applying to the program.
- Submit a completed online application.
- Be enrolled in a master's degree program at ODU.
- Have a background in undergraduate mathematics comparable to a minor in math, computer science, engineering, physics, or equivalent.
- Have a background in basic computer programming, preferably C++ or Java and exposure to at least one other programming language, and basic data structures.

Non-degree seeking students will:

- Submit a completed online application and application fee.
- Submit official transcripts of all undergraduate and graduate coursework from regionally accredited institutions.
- Have a master's degree from an accredited academic institution.
- Submit record of current teaching license.
- Have a background in undergraduate mathematics comparable to a minor in math, computer science, engineering, physics, or equivalent.

Students who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer based TOEFL or 80 on the TOEFL iBT.
- A sample of scholarly writing.
- Three letters of recommendation, at least one of which evaluates proficiency in English.

## Curriculum Requirements

The curriculum is designed to provide students with knowledge of foundational and advanced aspects of computing. Coursework will provide students with principles of computing including discrete mathematics, basic automata theory, and algorithm design and analysis. The core courses

will train students to analyze computer algorithms and design relational databases. Students will be educated in SQL database procedures, entity-relationship modeling, database normalization, and database transaction concurrency.

The certificate requires a total of 18 credit hours.

### Core Courses

CS 500	Foundations of Computing	3
CS 550	Database Concepts	3

### Select four of the following electives: 12

CS 517	Computational Methods and Software
CS 522	Introduction to Machine Learning
CS 532	Web Science
CS 571	Operating Systems
CS 580	Introduction to Artificial Intelligence
CS 600	Algorithms and Data Structures
CS 620	Introduction to Data Science and Analytics
CS 624	Data Analytics and Big Data
CS 625	Data Visualization
CS 665	Computer Architecture
CS 722	Machine Learning
CS 732	Human Computer Interaction
CS 733	Natural Language Processing
CS 734	Introduction to Information Retrieval

### Total Credit Hours 18

Note that students who wish to apply these credits towards a Masters degree in computer science may count no more than four (4) 500-level courses towards the Masters degree requirements.