

1) Computer Science in the Elementary Classroom (EDMA 269)

Description: Our society's increased dependence on technology is generating a need for highly qualified individuals who have the skills to support and create that technology. Thus, it is never too early to introduce the fundamentals of computer science to elementary school students—and this course will help you do just that.

In this course, you'll learn strategies for preparing children to meet the needs of our modern society, starting with the basics of computational thinking in lower elementary and moving into beginning programming in upper elementary. You'll review a variety of resources and choose those that will work best in your classroom setting given your access to technology. In addition, you'll learn the long-term benefits of teaching student's computer science skills and how to be good digital citizens.

Delivery Method: online (synchronous and asynchronous)

Credit: Two Graduate Credit Hours (offered through Drake's School of Education Continuing Education and Professional Development).

Cost: Estimated cost of \$415 per participant.

2) Secondary Computer Science Methods

Course Description

Building upon prior computer science coursework and teaching experiences, the aim of this course is to prepare teachers to teach middle and high school computer science courses. Course content will emphasize *standards-based* instruction in alignment with the Computer Science Teachers Association K-12 Standards both in terms of content taught and the development of practices.

The structure of the course is based on class activities and discussions with significant preparation required outside of class. Teachers will be assigned reading, writing, and project-based tasks focused on eliciting student thinking, implementation of research-based instructional practices, selection and adaptation of curricular materials, and assessment for learning strategies.

Course Goals

By the end of this course, teachers will be able to:

- a) Describe the intended computer science curriculum and associated learning trajectories as outlined in the CSTA K-12 Standards in terms of both content and practices.
- b) Explain common student misconceptions and learning difficulties in foundational computing concepts and associated strategies to scaffold student thinking.
- c) Modify curricular resources in order to produce high quality projects and lesson plans that elicit student thinking and challenge commonly held misconceptions with the following considerations:
 - a. Access for all students
 - b. Fostering an inclusive computing learning environment

- c. Collaboration and communication about computing
 - d. Recognizing and defining computational problems
 - e. Developing and using abstractions
 - f. Creating computing artifacts and testing and refining them accordingly.
- d) Develop a strategy for ongoing formative and summative assessment that both supports student learning and informs instructional efforts.
 - e) Elicit student thinking through a variety of questioning techniques and lead productive class discussion.

Delivery Method: Online or Hybrid

Credit: 3 graduate credit hours

Cost: approximately \$1,500 per participant

3) Introduction to Computer Science

An introduction to the field of computer science is provided emphasizing problem solving using a high-level programming language. Algorithms, basic data representation, language control structures, debugging, and program verification will be discussed. Objects will be introduced, used, and created.

State CS endorsement requirements: https://educateiowa.gov/sites/files/ed/documents/ObtainingAComputerScienceTeachingEndorsement_508.pdf

This course covers topics in the first two boxes in the Content requirements:

- Data representation and abstraction to include primitive data types, static and dynamic data structures, and data types and stores
- Designing, developing, testing and refining algorithms to include proficiency in two or more programming paradigms.

Delivery Method: Online or Hybrid

Credit: 3 graduate credit hours

Cost: approximately \$1,500 per participant