

# Computer Science Education

---

## Department Information

- **Department Head:**  
Kendall E. Nygard, Ph.D.
- **Graduate Coordinator:**  
Gursimran Walia, Ph.D.
- **Department Location:**  
258 QBB
- **Department Phone:**  
(701) 231-8562
- **Department Email:**  
gradinfo@cs.ndsu.edu
- **Department Web Site:**  
cs.ndsu.edu/
- **Credential Offered:**  
Certificate
- **English Proficiency Requirements:**  
TOEFL iBT 79; IELTS 6.5

This certificate is primarily aimed at high school teachers in need of credentials to teach "dual credit" courses in their schools as well as AP Computer Science instructors. To meet the needs of the program the courses must be (1) online; (2) taught in the summer; and (3) taught in a condensed or hybrid format.

The graduate certificate in Computer Science Education is comprised of six 3-credit courses for a total requirement of eighteen credits, aimed at preparing for teaching high school CS. The certificate program will be offered online, all year long as courses are developed. The courses are selected for their content which covers the essential, core concepts of Computer Science, and how to teach them.

## PROGRAM OBJECTIVES:

The Graduate Certificate Program in Computer Science Education will focus on the following:

1. Focus on fundamental topics providing a broad background in Computer Science.
2. Be flexible enough to allow students from varied backgrounds and different points in their working career to enter the program with a minimum of pre-requisite work.
3. Be flexible enough to allow students currently pursuing advanced degrees in computing related disciplines to join the program and readily add the Graduate Certificate to their credentials.
4. Provide the necessary 18 credit hours for high school teaching credentials while presenting a course offering schedule to allow students to complete the program in fifteen months.
5. Make maximum use of existing department resources at NDSU to support delivery of the program.
6. Gain a broad background and knowledge in Computer Science Education through a fixed set of core courses.

## Required Courses

Code	Title	Credits
CSCI 641	Introduction to Computer Science Education	3
CSCI 642		
CSCI 643		
CSCI 644		

## Electives (choose from two of the following)

Code	Title	Credits
CSCI 645		
CSCI 713	Software Development Processes	3
CSCI 724	Survey of Artificial Intelligence	3

CSCI 765	Introduction To Database Systems	3
CSCI 773	Foundations of the Digital Enterprise	3

## Digital Portfolio

As part of the Graduate Certificate Program every student will prepare a .Digital Portfolio. with artifacts of accomplishment that is shareable and organized for final presentation. This Digital Portfolio will document the information necessary to teach any Computer Science course needed in the high school. Artifacts will be added to the portfolio after the completion of each course, as follows.

**CSCI 641** Document 1-Develop Course syllabus (with course outline) for the proposed class/topic. Document course description, objectives, textbook/software/ hardware support, course learning goals, educational practices and assessment criteria.

**CSCI 642** Document 2 - Instructor Course Web site with course syllabus, detailed course outline, teaching materials, and support materials

**CSCI 643** Document 3 - Document with the set of home assignments, in-class problems, quizzes, and exams, with specific grading criteria such as what factors will be graded, how they will be weighted, and how they will be translated into the overall grade.

Document 4 - Document with description and requirements of the Final project, including: problem requirements, design, solution, test plan, support documentation and solution documentation

**CSCI 644** Document 5 - Web site/document designed and delivered after every elective course with syllabus, assignment examples, exam examples, the description of the possible team project, and references to the support material

Document 6 - Develop a set of problems and solutions for every topic. Develop grading Rubrics for every project

At the end of the Graduate Certificate Program every Digital Portfolio will be presented and evaluated by classmates and professor in-class. Portfolios will be used to evaluate students and bolster accreditation.