CSED 2310
Foundational Concepts of Computer Science
Spring 2025

Course Learning Outcomes

Course Catalog Description

Examine the breadth of the field of computer science beyond the programming of the computers. Topics include data storage and manipulation, computer organization, operating systems, networking and the Internet, software engineering, databases, and artificial intelligence. Give teachers a general introduction to commonly taught sub-disciplines in computer science so that they can have informed discussions with students.

The Mission of the UNI Educator Preparation Program

The UNI Educator Preparation Program provides an authentic and challenging education that empowers candidates to serve as reflective, professional educators who advocate for students, schools, communities, and the profession in a dynamic and changing world.

Belief Statements UNI Educator Preparation Program:

1. Candidates must deeply understand and reflect on their content and pedagogy.

2. Candidates must engage in rich, purposeful, and authentic field-based experiences to develop appropriate dispositions and practices.

3. Candidates have a responsibility to understand historical, social, cultural, and political contexts and how they impact education.

4. Candidates must understand the importance of diversity and equity and engage in opportunities to promote social justice.

5. Candidates must develop competence in the skills and dispositions that allow them to engage in effective leadership and advocacy.

6. Candidates must develop strong skills in order to effectively collaborate with all stakeholders for student learning.

Course Competencies

The material in this course has been designed to align with

The CSTA K-12 Standards (https://csteachers.org/k12standards/)

The CSTA Standards for CS Teachers (https://csteachers.org/teacherstandards/).

The material in this course has been divided into 18 competencies that well-educated CS teachers should be able to demonstrate.

Competency 1: Understand that the fundamental building blocks of computers are logic gates. Given their inputs, determine the output of a simple collection of common gates. [3B-CS-02]

Competency 2: Understand that a computer operates using collections of 0s and 1s (bits). Apply this knowledge to convert between a variety of numerical encodings. [3A-DA-09]

Competency 3: Understand that a computer operates using collections of 0s and 1s (bits). Apply this knowledge to common forms of media, discussing both storage structure and storage size. [3A-DA-09]

Competency 4: Understand that computers are not infallible. Explain what causes various errors and how some can be detected and corrected. [3A-DA-09]

Competency 5: Understand computer memory and data storage. Discuss these concepts in various contexts, including the CS classroom and daily life. [3A-DA-10]

Competency 6: Identify the traditional hardware components of a computer and describe their relationships and interactions. [3A-CS-01, Educator 1b]

Competency 7: Apply an understanding of a CPU's instruction set and the instruction cycle to various scenarios. [3A-CS-01]

Competency 8: Understand the role and functionality of the components of an operating system. [3B-CS-01, Educator 1b]

Competency 9: Understand the role and functionality of the processes managed by the operating system [3A-CS-02, Educator 1b]

Competency 10: Understand the role and functionality of the operating system in addressing various security issues. [2-NI-04]

Competency 11: Explain how a network consists of autonomous systems communicating through established protocols. [3A-NI-04, 3B-NI-03, Educator 1c]

Competency 12: Apply and explain network processes using common Internet transactions. [2-NI-04, Educator 1c]

Competency 13: Define and discuss various network-based cybersecurity problems and recommend security measures to address these attacks. [3A-NI-05, 3A-NI-06, Educator 1c]

Competency 14: Recognize and explain the fundamental elements of database systems, including their roles, structure, functionality, and characteristics. [3A-DA-10, 3A-IC-29]

Competency 15: Recognize and discuss fundamental techniques of big data and data mining. [3A-DA-12, Educator 1d]

Competency 16: Define and properly use the common vocabulary of artificial intelligence. [3B-AP-08]

Competency 17: Identify and discuss a variety of historic AI techniques. [3A-DA-12]

Competency 18: Analyze and discuss the social and ethical impacts of computer science with respect to modern society connecting to the topics of the course. [3A-NI-06, 3A-NI-07, 3A-IC-28, 3A-IC-29, 3A-IC-30, 3B-IC-27, 3B-IC-28, Educator 1f]

Course Grading

Grading Structure

I use a grading system that is a combination of standards-based grading and Grading for Equity. My main beliefs are:

- As the teacher, my job is to design a variety of chances for you to learn material, practice required skills, and demonstrate overall competency.

- As the student, your job is to show that you can meet the course outcomes by demonstrating the defined competencies.

- Your final grade in the class should indicate how well you were able to meet course objectives/competencies by the end of the semester.

I WANT you to succeed in the course. That means giving you multiple opportunities to show that you can demonstrate course competencies. In most cases, if you can't do this the first time, you will be able to re-study and try again.

You will complete a variety of activities in this course to demonstrate your abilities. For each, your deliverable will be converted to a competency evaluation score from 1-4 which is a summarization of the overall competency you have demonstrated based on the following rubric:

Score	Meaning
1	UNASSESSABLE - You submitted deliverables for the activity but what you submitted shows little understanding of the competency being assessed.
2	NEEDS WORK - You have made significant progress towards demonstrating competency but there are limited items that remain unsatisfied.
3	SATISFACTORY - You have **met** the standards of the competency. [Your results show reasonable competency with few mistakes or remaining issues.]
4	EXCELLENT - You have **exceeded** the standards of the competency. [You have met the standards of competency and shown considerable understanding/knowledge of the material.]

While it might be tempting to view these categories as similar to GPA categories (which also use a 4-point scale) that is not the way they are used or interpreted.

If you are unsatisfied with your score on any competency or activity (in particular, if you did not earn at least a 3), you may meet with me to discuss the situation, restudy the material, and make a second attempt to demonstrate your ability to meet the standards of the competency/activity.

Final Grades

Final course grades will be determined using the following evaluation criteria.

Grade Earned	Average Score	Additional Conditions
A	> 3.5	All scores 3-4
A-	> 3.5	All scores 2-4
B	> 3	All scores 3-4
B-	> 3	All scores 1-4
C	> 2.5	All scores 2-4
C-	> 2.5	All scores 1-4
D	> 2	All scores 2-4
D-	> 2	
F	≤ 2	

Additional Comments:

- Because I allow – and encourage – retakes, most students do well in this course. It is rare for a student who has been an active participant in the class to not earn at least a C for a final grade.

- If I feel there are specific and individual circumstances where "mathematically" you earned a grade slightly lower than I feel your overall competence has demonstrated, then I reserve the right to raise your grade one level from that published above.

- To be responsive to your needs I reserve the right to modify the structure of this course as we are in progress. If there is significant deviation from the policies described in this syllabus, the new policy will be clearly discussed with you and in a timeframe that gives you time to plan accordingly.