

CAREER TECHNICAL EDUCATION (CTE) COURSE COMPETENCIES

Foundations of Computer Science

Course No. 41010 Credit: 1.0

Student name: _____ Graduation Date: _____

Pathways and CIP Codes: Programming & Software Development (11.0201)

Course Description: Technical Level: Students develop an understanding of computer science concepts and use computational thinking skills to solve problems through a variety of programming languages and platforms. Students also develop skills in collaboration and teamwork using work models such as pair programming. This course provides a rich technical foundation for continued study

Directions: The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

RATING SCALE:

4. **Exemplary Achievement:** Student possesses outstanding knowledge, skills or professional attitude.
3. **Proficient Achievement:** Student demonstrates good knowledge, skills or professional attitude.
Requires limited supervision.
2. **Limited Achievement:** Student demonstrates fragmented knowledge, skills or professional attitude.
Requires close supervision.
1. **Inadequate Achievement:** Student lacks knowledge, skills or professional attitude.
0. **No Instruction/Training:** Student has not received instruction or training in this area.

BENCHMARK 1: COMPUTATIONAL THINKING

Competencies

#	DESCRIPTION	RATING
1.1	Deconstruct a complex problem into simpler parts using predefined constructs (e.g., functions and parameters and/or classes)	_____
1.2	Demonstrate the value of abstraction for managing problem complexity (e.g., using a list instead of discrete variables).	_____
1.3	Design algorithms using sequence, selection, and iteration.	_____
1.4	Use a systematic approach and debugging tools to independently debug a program (e.g., setting breakpoints, inspecting variables with a debugger).	_____
1.5	Convert between binary, decimal, and hexadecimal representations of data (e.g., convert hexadecimal color codes to decimal percentages, ASCII/Unicode representation).	_____
1.6	Use simple encryption and decryption algorithms to transmit/receive an encrypted message.	_____

BENCHMARK 2: COMPUTING AND SOCIETY

Competencies

#	DESCRIPTION	RATING
2.1	Debate the social and economic implications associated with ethical and unethical computing practices (e.g., intellectual property rights, hacktivism, software piracy, diesel emissions testing scandal, new computers shipped with malware).	_____

#	DESCRIPTION	RATING
2.2	Compare and debate the positive and negative impacts of computing on behavior and culture (e.g., evolution from hitchhiking to ridesharing apps, online accommodation rental services, generative artificial intelligence).	
2.3	Compare and contrast multiple viewpoints on cybersecurity (e.g., from the perspective of security experts, privacy advocates, the government)	
2.4	Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques.	

BENCHMARK 3: CREATE COMPUTATIONAL ARTIFACTS

Competencies

#	DESCRIPTION	RATING
3.1	Design and develop a software artifact working in a team.	
3.2	Compare and contrast various software licensing schemes (e.g., open source, freeware, commercial).	
3.3	Design, develop, and implement a computing artifact that responds to an event (e.g., robot that responds to a sensor, mobile app that responds to a text message, sprite that responds to a broadcast).	
3.4	Use user - centered research and design techniques (e.g., surveys, interviews) to create software solutions.	
3.5	Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computing artifacts.	

I certify that the student has received training in the areas indicated.

Instructor Signature: _____

For more information, contact:

CTE Pathways Help Desk
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