Information Technology Career Cluster
Computer Science Principles
Course Number: 11.47100

Course Description:
How can computing change the world? What is computer science? Engage your creativity, demonstrate and build your problem solving ability all while connecting the relevance of computer science to the society! Computer Science (CS) Principles is an intellectually rich and engaging course that is focused on building a solid understanding and foundation in computer science. This course emphasizes the content, practices, thinking and skills central to the discipline of computer science. Through both its content and pedagogy, this course aims to appeal to a broad audience. The focus of this course will fall into these computational thinking practices: connecting computing, developing computational artifacts, abstracting, analyzing problems and artifacts, communicating, and collaborating.

Various forms of technologies will be used to expose students to resources and application of computer science. Professional communication skills and practices, problem-solving, ethical and legal issues, and the impact of effective presentation skills are enhanced in this course to prepare students to be college and career ready. Employability skills are integrated into activities, tasks, and projects throughout the course standards to demonstrate the skills required by business and industry.

Computer Science Principles is the second course in the pathways Programming and Computer Science in the Information Technology Cluster. Students enrolled in this course should have successfully completed Introduction to Digital Technology.

Course Standard 1

IT-CSP-1
The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

Standard: Demonstrate employability skills required by business and industry.
The following elements should be integrated throughout the content of this course.

1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions
				Obtaining Feedback
				Getting Others to Listen

Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter
Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé
Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé
Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers
Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss
Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict
Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism

International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence L9-10RST 1-10 and L9-10WHST 1-10:
Georgia Standards of Excellence ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses.

Course Standard 2

IT-CSP-2
Create digital artifacts that foster creative expression including programs, digital music, videos, images, documents, and combinations of these such as infographics, presentations, and web pages.

2.1 Understand and use software tools by combining and modifying existing artifacts or by creating new artifacts.
2.2 Collaborate as a team to develop an artifact that represents multiple perspectives.
2.3 Show functionality and suitability (or appropriateness) of a computational artifact.
2.4 Develop a program for creative expression or to satisfy personal curiosity which may have visual, audible, or tactile results.
2.5 Develop a program specifically with the goal of solving a problem, creating new knowledge, or helping people, organizations, or society.
2.6 Use computing tools and techniques for creative expression.

Course Standard 3

IT-CSP-3
Apply abstractions in digital data to explain how bits are grouped to represent higher-level abstractions such as numbers and characters.

3.1 Model how a combination of abstractions built upon binary sequences can be used to represent all digital data.
3.2 Understand levels of all digital data representation (i.e. lowest is bits).
3.3 Show multiple levels of abstraction used in computation.
3.4 Describe how software is built using low and high level abstractions.
3.5 Explain how binary data is processed using physical layers of computing hardware, including gates, chips, and components.
3.6 Compare and contrast past, current, and trending programming languages, from low to high levels, used in developing software.
3.7 Understand how models and simulations use abstraction to raise and answer questions.
3.8 Provide examples and explanations of how society uses models and simulations to generate new understanding of knowledge.
3.9 Demonstrate skills and knowledge that models use different levels of abstraction to represent phenomena.

Course Standard 4

IT-CSP-4
Design and create computer programs to process and extract information to gain insight and knowledge.

4.1 Collaborate to develop hypotheses and questions, and testing hypotheses to answer questions about data to gain insight and knowledge.

4.2 Present insight and knowledge gained from data using visualizations, notation and precise language.
4.3 Write a scientific report modeling a written research paper on big data applications.
4.4 Define use of scalability of systems and analytical approaches as they are used in large data sets.
4.5 Use computing tools to discover a connection in information by computing facilitates.
4.6 Explain how computational manipulations of information require consideration of representation, storage, security, and transmission.
4.7 Debate the trade-offs in representing information as digital data.
4.8 Justify the format of data storage based upon the principles of many formats of storage, size, and intended use of manipulated computationally.

Course Standard 5

IT-CSP-5
Develop, express, implement, and analyze algorithms analytically and empirically.

5.1 Develop an algorithm designed to be implemented to run on a computer.
5.2 Explain the building blocks of algorithms: sequencing, selection, iteration, and recursion.
5.3 Express an algorithm in a language.
5.4 Describe the purpose and output variances of each type of language including natural language, pseudo code, and visual and textual programming languages.
5.5 Connect problems to potential algorithmic solutions and explain an example of problems that cannot be solved using algorithms.
5.6 Evaluate algorithms analytically and empirically.

Course Standard 6

IT-CSP-6
Create programs that translate human intention into computational artifacts including music, images, visualizations, and more while exploring the concepts, techniques and development used in writing programs.

6.1 Explain how programs implement algorithms.
6.2 Use abstraction to manage complexity in programs.
6.3 Evaluate a program for correctness i.e. program style affecting the determination of program correctness.
6.4 Locate and correct errors in a program.
6.5 Justify and explain a program's correctness.
6.6 Develop a correct program.
6.7 Collaborate to solve a problem using programming.

Course Standard 7

IT-CSP-7
Gain insight into the operation of the Internet, study characteristics of the Internet and systems built upon it, and analyze important concerns, such as cybersecurity.

7.1 Explain the abstractions in the Internet and how the Internet functions.
7.2 Explain characteristics of the Internet and the systems built on it.
7.3 Analyze how characteristics of the Internet and the systems built on it influence use.
7.4 Connect the concern of cybersecurity with the Internet and the systems built on it.

Course Standard 8

IT-CSP-8

Develop a logical argument from the many ways in which computing enables innovation and our methods for communicating, collaborating, problem solving, and doing business, and analyze the potential benefits and harmful effects of computing in a the way people think, work, live, and play.

8.1 Analyze how computing affects communication, interaction, and cognition.
8.2 Collaborate as part of a process that scales.
8.3 Connect computing with innovations in other fields.
8.4 Analyze the beneficial and harmful effects of computing.
8.5 Connect computing within economic, social, and cultural contexts.

Course Standard 9

IT-CSP-9

Explore how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects, entrepreneurship development, and competitive events.

9.1 Explain the goals, mission and objectives of Future Business Leaders of America.
9.2 Explore the impact and opportunities a student organization (FBLA) can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs.
9.3 Explore the local, state, and national opportunities available to students through participation in related student organization (FBLA) including but not limited to conferences, competitions, community service, philanthropy, and other FBLA activities.
9.4 Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.
9.5 Explore the competitive events related to the content of this course and the required competencies, skills, and knowledge for each related event for individual, team, and chapter competitions.