

CTE Course Description and Standards Crosswalk

Course Information	
Course Name	AP Computer Science Principles, Semester 1
Course Number	84831
Number of High School Credits	.5
Sequence or CTEPS (You must first have the Sequence or CTEPS entered into the EED-CTE system.)	Computer Science
Date of district Course Revision	April 2017
Career & Technical Student Organization (CTSO)	
CTSO embedded in this sequence	BPA, SkillsUSA
Occupational Standards	
Source of Occupational Standards	NBEA, ISTE
Names/Numbers of Occupational Standards	NBEA IT, ISTE all
Registration Information	
Course Description (brief paragraph – as shown in your student handbook or course list)	This course will introduce students to the creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity concerns, and computing impacts. AP Computer Science Principles will give students the opportunity to use technology to address real-world problems and build relevant solutions.
Instructional Topic Headings (please separate each heading by a semi-colon)	Create computational artifacts; Use computing tools and techniques; Describe and develop a variety of abstractions; Explain how binary sequences; Use Models and Simulations; Test Hypothesis; Examine and analyze data; Evaluate, create and analyze programs; Cybersecurity; Safety and security; CTSO involvement; Career exploration; Ethics
Summative Assessments and Standards	
Technical Skills Assessment (TSA)	No
Course addresses:	
New Alaska ELA and Math Standards	Yes
Alaska Cultural Standards	Yes
All Aspects of Industry (AAI)	Yes
Core Technical Standards	Yes
Employability Standards	Yes
Employability Standards	
Source of Employability Standards	State of Alaska
Tech Prep	
Current Tech Prep Articulation Agreement? (Y/N)	No
Date of Current Agreement	
Postsecondary Institution Name	
Postsecondary Course Name	
Postsecondary Course Number	
# of Postsecondary Credits	

Additional CTE Course Information

Author	
Course developed by	Noelle Mischenko, Brian Mead, John Notestine
Course adapted from	Computer Science Principles, AP
Date of previous course revision	2016
Course Delivery Model	
Is the course brokered through another institution or agency? (Y/N)	Y – Harvard CS50 and MIT Mobile CSP

Standards Alignment

Student Performance Standards (Learner Outcomes or Knowledge & Skill Statements)	Specific Occupational Skills Standard	Common Technical Core Standards	New Alaska ENG/LA Standards	New Alaska Math Standards	Alaska Cultural Standards	Employability/ Career Readiness Standards	All Aspects of Industry/ Systems	Assessment
Analyze the correctness, usability, functionality, and suitability of computational artifacts.	ISTE 5B	IT-PRG 1,3,8 IT-WD 1,3,7,8	L9-12.6	MP 1, 2, 3, 4, 5, 6, 7	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Describe the variety of abstractions used to represent data	ISTE 6C, 6D	IT-PRG 6	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Explain how binary sequences are used to represent digital data	ISTE 6A, 6B, 6C	IT-PRG 3, 5	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Develop an abstraction when writing a program or creating other computational artifacts.	ISTE 3A, 3B	IT 2 IT-PRG 2, 4, 5, 6 IT-WD 5,6	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Identify multiple levels of abstractions that are used when writing programs	ISTE 4A, 4B, 4C, 4D	IT-PRG 3, 5, 6, 10 IT-WD 2, 4, 5, 6	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam

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Use models and simulations to represent phenomena and test hypotheses	ISTE 4A, 4B, 4C, 4D, 5C	IT 2 IT-PRG 2, 3, 4, 7 IT-WD 2, 4, 6, 7	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Collaborate when processing information to gain insight and knowledge	ISTE 7B, 7C, 7D	IT 3 IT-PRG 1 IT-WD 1,4,6	SL.9-12.1.a-d	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2, A5	Technology Technical Skills	AP Exam
Develop an algorithm for implementation in a program	ISTE 4C	IT 2 IT-PRG 5, 6 IT-WD 3, 6, 8	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Express an algorithm in a language	ISTE 6B	IT-PRG 5,6 IT-WD 5,6	L.9-12.6 L9-12.2.a	MP 1, 5, 6	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain the difference between algorithms that run in a reasonable time and those that do not run in a reasonable time	ISTE 6C, 6D	IT 5 IT-PRG 5,6,7 IT-WD 2, 5,6,8	L.9-12.6 L9-12.2.a	MP 1, 6, 7	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain the difference between solvable and unsolvable problems in computer science	ISTE 3B,6C	IT-PRG 5,6,7 IT-WD 2, 5,6,8	SL.9-12.4	MP 1, 2, 3, 6, 7	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain the existence of undecidable problems in computer science	ISTE 6C	IT-PRG 3,4,5,6,7, IT-WD 2,5,6,7,8,	SL.9-12.4	MP 1, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Evaluate algorithms analytically and empirically for efficiency, correctness and clarity	ISTE 5B, 5C	IT-PRG 3,4,5,6,7, IT-WD 2,5,6,7,8,	L9-12.6	MP 1, 2, 3	B2, B3, B4	A2	Technology Technical Skills	AP Exam

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Collaborate to develop a program	ISTE 7B, 7C	IT 3 IT-PRG 1,2,5,8,9,10 IT-WD 1,2,3,4,6,9	SL.9-12.1.a-d	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2, A5	Technology Technical Skills	AP Exam
Use abstraction to manage complexity in programs	ISTE 4D	IT 2 IT-PRG 4,5,6,7,8,9, 10 IT-WD 5,6,8,	L.9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Evaluate the correctness of a program	ISTE 5B	IT 12 IT-PRG 3,4,5,7,8,9 IT-WD 8,	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Employ appropriate mathematical logical concepts in programming	ISTE 4A, 4C	IT-PRG 4,5,6,7,8,9, 10 IT-WD 5,6,8,	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Encourage CTSO involvement.	IT-XVII EN-I ISTE 1, 7A, 7B, 7C, 7D	IT 1,3 IT-PRG 7,8,9	L.9-12.6 SL.9-12.6 SL.9-12.1.a-d	MP 1, 2, 3, 5, 6, 7, 8	B2,3,4 C4 D6 E7,8	A2,5	Technical Skills Technology Planning Labor Work Habits	BPA Competitions
Research career opportunities in the Computer Science industry.	IT-XVII EN-I CD-II ISTE 1	IT-PRG 2,4,7 IT-WD 4,6,8,9,10	L.9-12.6 SL.9-12.6 WHST.9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2,3,4	A1,2,3,4,5,6, 7 B1,2,3,4,5	Technical Skills Planning Technology	AKcis Portfolio
Demonstrate safe use of tools and equipment, cyber safety and ergonomic safety in the workplace.	IT-I ISTE 2A, 2B, 2C, 2D	IT4,8 IT-PRG 2,7,8,9 IT-WD	L.9-12.6 WHST.9-12.8	MP 5	B2,4	A1,6	Technical Skills Health/Safety	AK EED Safety Manual Business &

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		1,2,3,4,5,6,8,10						Information Systems
Practice and promote ethics and ethical behavior in the workplace	IT-I ISTE 2A, 2B, 2C, 2D	IT4 IT-PRG 1,2 IT-WD 1,2,3,4,8,10	WHST.9-12.8	MP 1, 2, 3, 6, 7, 8	B2,3,4	A,1,2,5	Technical Skills Work Habits Management	CTSO Participation

Instructional Resources

List the major instructional resources used for this course: (websites, textbooks, essential equipment, reference materials, supplies)

Link to AP Computer Science Principles Curriculum Framework: <https://secure-media.collegeboard.org/digitalservices/pdf/ap/ap-computer-science-principles-curriculum-framework.pdf>

Link to CS50 class and curriculum: <https://ap.cs50.net/>

<https://www.w3schools.com/>

<https://www.codecademy.com/>

<https://www.khanacademy.org/>

<https://www.thefirehoseproject.com/>

Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion. Hal Abelson, Ken Ledeen, & Harry Lewis (2008) PDF of text available for free through Mobile CSP Curriculum: http://www.bitsbook.com/wp-content/uploads/2008/12/b2b_3/pdf#page=19

C Programming Absolute Beginner's Guide, Third Edition

Greg Perry, Dean Miller

Pearson Education, 2014

ISBN 0-789-75198-4

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Hacker's Delight, Second Edition

Henry S. Warren Jr.

Pearson Education, 2013

ISBN 0-321-84268-5

How Computers Work, Tenth Edition

Ron White

Que Publishing, 2014

ISBN 0-7897-4984-X

Programming in C, Fourth Edition

Stephen G. Kochan

Pearson Education, 2015

ISBN 0-321-77641-0

Harvard University's CS50 curriculum adapted for AP computer Science Principles online as a self-paced course: <https://www.edx.org/course/apr-computer-science-principles-harvardx-cs50-ap>