

CTE Course Description and Standards Crosswalk

Course Information	
Course Name	AP Computer Science Principles, Semester 2
Course Number	84832
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
Apply a creative development process when creating computational artifacts	ISTE 3D, 4A, 4B, 4C	IT 2 IT-PRG 5,10 IT-WD 2	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 7	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Create a computational artifact for creative expression	ISTE 4A, 4B, 4C	IT 2 IT-WD 2	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7	B2, B4	A2	Technology Technical Skills	AP Exam
Collaborate in the creation of computational artifacts	ISTE 7A, 7B, 7C, 7D	IT 3 IT-PRG 5 IT-WD 2, 6	SL.9-12.1.-d	MP 1, 2, 3, 5, 6, 7	B2, B4	A2, A5	Planning Technology Technical Skills	AP Exam
Use computing tools and techniques for creative expression.	ISTE 6A, 6B, 6C, 6D	IT 2 IT-PRG 2 IT-WD 2,5,6	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Find patterns and test hypotheses about digitally processed information to gain insight and knowledge	ISTE 5A, 5B, 5C	IT-PRG 5, 7,8 IT-WD 2, 4,7	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam

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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
Explain the insight and knowledge gained from digitally processed data by using appropriate visualizations, notations, and precise language	ISTE 6A, 6B, 6C	IT-PRG 3,6, 8 IT-WD 1, 2, 3, 7	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Extract information from data to discover and explain connection or trends	ISTE 5B, 5C	IT 6 IT-PRG 8, 9 IT-WD 7, 8, 9	L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Determine how large data sets impact the use of computational processes to discover information and knowledge	ISTE 5B, 5C	IT-PRG 3, 5 IT-WD 3, 7	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2	Technology Technical Skills	AP Exam
Analyze how data representation, storage, security, and transmission of data involve computational manipulation of information	ISTE 2C, 2D	IT-PRG 7, 8 IT-WD 4, 7,8	L9-12.6	MP 1, 2, 3, 4, 5, 6, 7, 8	B2, B3, B4	A2	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
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
Develop a program for creative expression, to satisfy personal curiosity, or to create new knowledge	ISTE 4C, 4D	IT 2 IT-PRG 1,4,5,6IT-	L.9-12.6 L9-12.2.a	MP 1, 5, 6, 7	B2, B3, B4	A2	Technology Technical Skills	AP Exam

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		WD 1,2,5,6,9						
Develop a correct program to solve problems	ISTE 4A, 4B	IT 2 IT-PRG 1,2,3,4,5,6, 7,8,9,10IT- WD 1,2,3,4,5,6, 7,8,9	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
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
Explain how programs implement algorithms	ISTE 6C, 6D	IT-PRG 2,3,4,7IT- WD 3,4,7	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain characteristics of the internet and the systems built on it	ISTE 5C	IT-PRG 10 IT-WD 2,4,5,6	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Identify existing cybersecurity concerns and potential options to address these issues with the internet and the systems built on it	ISTE 2D	IT 10 IT-PRG 2,3,7,8IT- WD 3,5,6,7,8	L9-12.6	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain how computing innovations affect communication, interaction and cognition	ISTE 6C,7D	IT-PRG 2,4,5,7,8 IT-WD 1,3,7,	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain how people participate in a problem-solving process that scales	ISTE 7D	IT 3 IT-PRG 1,2,7,9IT- WD 1,2,8,9	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain how computing has impacted innovations in other fields	ISTE 6C, 6D	IT-PRG 1,2,	WHST.9- 12.9	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam

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		IT-WD 1,2,3,7						
Analyze the beneficial and harmful effects of computing	ISTE 1, 5A	IT 4, 5 IT-PRG 1,2,9 IT-WD 1,2,3,7,9	WHST.9- 12.9	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A2	Technology Technical Skills	AP Exam
Explain the connections between computing and real-world contexts, including economic, social, and cultural contexts	ISTE 7D	IT 5 IT-PRG 1,2,8,9IT- WD 1,2,3,4,10	SL.9-12.4	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4 E3	A2	Technology Technical Skills	AP Exam
Access, manage, and attribute information using effective strategies	ISTE 6D	IT IT-PRG 2,4, IT-WD 1,9,10	WHST.9- 12.8 L.9-12.6 L9-12.2.a	MP 1, 2, 3, 5, 6, 7, 8	B2, B4	A2, A5	Technology Technical Skills	AP Exam
Evaluate online and print sources for appropriateness and credibility	ISTE 5B	IT 2 IT-PRG 1,2 IT-WD 1,2,3,10	WHST.9- 12.8	MP 1, 2, 3, 5, 6, 7, 8	B2, B3, B4	A1, A2, A5	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 Competition s
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 2,7,8,9IT-	L.9-12.6 WHST.9- 12.8	MP 5	B2,4	A1,6	Technical Skills Health/Safe ty	AK EED Safety Manual Business &

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		WD 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>