Delaware Department of Education
CTE & STEM Office
401 Federal Street, Suite 256
Dover, DE 19901
PHONE: 302.735.4015 FAX: 302.739.1780

DELAWARE CTE PROGRAM OF STUDY APPLICATION

LOCAL EDUCATION AGENCY INFORMATION		
Local Education Agency (LEA):		
School(s) where the Program of Study will be Located:		**Program of Study Start Date:**
LEA CTE Coordinator Name:	**Phone:**	**E-Mail Address:**
Career Cluster Title: Information Technology	**Career Pathway Title:** Programming and Software Development	**Program of Study Title:** Computer Science

CTE Program of Study Course Titles & Sequence:

1. Exploring Computer Science (ECS)
2. AP Computer Science Principles (CSP)
3. AP Computer Science A (CSA)

CTE Program of Study Request:

☒ State-model CTE Program of Study
☐ Local CTE Program of Study

ASSURANCES & SIGNATURES

CTE Program of Study approval and funding is contingent upon the following assurances:

1. The LEA will comply with Delaware Administrative Code, 14 Del.C. §525, Requirements for Career and Technical Education Programs and the Delaware State Plan for the Carl D. Perkins Career and Technical Education Act of 2006;
2. The LEA will submit CTE program data as required by the Delaware Department of Education;
3. All teachers are certified in the appropriate CTE area and participate in program specific professional learning;
4. The LEA will convene and engage a program advisory committee for the purposes of program development, implementation, and continuous improvement;
5. All students have equal access to the program of study as well as early career/early college options;
6. Career and Technical Student Organizations are integral components of the program of study;
7. The LEA will maintain safe facilities and equipment aligned with the program of study goals; and
8. A process for continuous improvement has been established, which includes a model of evaluation and program improvement.

LEA CTE Coordinator Signature:	Date:
LEA Chief School Officer Signature:	Date:

PROGRAM ADVISORY COMMITTEE MEMBER INFORMATION	
Complete the list of program advisory committee members. Program of study representatives should include, but are not limited to: CTE and academic teachers, CTE/curriculum district coordinators, school counselors, business and industry representatives, labor representatives, and post-secondary partners. Community stakeholders including parents and students can also be considered. *Attach additional information if applicable*.	
Name:	Title:
Affiliation:	
Address:	
Phone:	E-Mail:
Area of Expertise:	
Representing: ☐ Business/Industry ☐ Secondary Education ☐ Post-Secondary Education ☐ Community/Other	
Name:	Title:
Affiliation:	
Address:	
Phone:	E-Mail:
Area of Expertise:	
Representing: ☐ Business/Industry ☐ Secondary Education ☐ Post-Secondary Education ☐ Community/Other	
Name:	Title:
Affiliation:	

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Phone:	E-Mail:
Area of Expertise:	
Representing: ☐ Business/Industry ☐ Secondary Education ☐ Post-Secondary Education ☐ Community/Other	
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Phone:	E-Mail:
Area of Expertise:	
Representing: ☐ Business/Industry ☐ Secondary Education ☐ Post-Secondary Education ☐ Community/Other	
Name:	Title:
Affiliation:	
Address:	
Phone:	E-Mail:
Area of Expertise:	

Representing:

- ☐ Business/Industry
- ☐ Secondary Education
- ☐ Post-Secondary Education
- ☐ Community/Other

LABOR MARKET DEMAND

Certify that a labor market needs analysis has been completed for the proposed CTE program of study. Attach the *Labor Market Information (LMI) Review* document.

Access the *Labor Market Information (LMI) Review* document.

☒ The LEA certifies that regional, state, and local labor market data have been reviewed to assure a demand exists for the POS occupations and that the number of POS completers will not significantly exceed this demand. Department of Labor data are available and/or documented. Supporting evidence of supply and demand is submitted with this proposal.

☐ No data exist for POS due to a unique labor market demand. Supporting evidence of demand is submitted with this proposal. Evidence may include, but is not limited to: real-time labor market information, documentation of national, regional, state, or local labor trends, or letters from employers or workforce agencies documenting projected employment specific to the career pathway.

ACADEMIC AND TECHNICAL SKILL STANDARDS

List the academic, technical, and workplace skills and knowledge used to develop the program of study.

Title and source of academic standards:

Common Core State Standards (CCSS)

The Common Core State Standards (CCSS) are national standards that set clear college- and career-ready expectations for kindergarten through 12th grade in English language arts/literacy and Mathematics. The standards help to ensure that students graduating from high school are prepared to take credit bearing introductory courses in two- or four-year college programs and enter the workforce. The standards were developed by the nation's governors and education commissioners, through their representative organizations, the National Governors Association Center for Best Practices (NGA) and the Council of Chief State School Officers (CCSSO). Teachers, parents, school administrators, and experts from across the country provided input into the development of the standards. The implementation of the Common Core, including how the standards are taught, the curriculum developed, and the materials used to support teachers as they help students reach the standards, is led entirely at the state and local levels. For more information on CCSS, please visit the link above.

Next Generation Science Standards (NGSS)

The Next Generation Science Standards (NGSS) are national standards for science that lay out the disciplinary core ideas, science and engineering practices, as well as crosscutting concepts that students

should master in preparation for college and careers. The standards were developed through a state-led effort that was managed by Achieve. The development of the NGSS involved the National Research Council (NRC), the National Science Teachers Association (NSTA), the American Association for the Advancement of Science (AAAS), and other critical partners such as K–12 teachers, state science and policy staff, higher education faculty, scientists, engineers, cognitive scientists, and business leaders. For more information on the NGSS, please visit the link above.

The Exploring Computer Science (ECS) curriculum was developed from a framework of both computer science content and computational practice. A crosswalk of maps and standards alignment for the Common Core State Standards and the Next Generation Science Standards are available at: http://pact.sri.com/. The AP Computer Science Principles (CSP) course has been proposed by the College Board for Advanced Placement (AP) credit and was developed from a framework of computer science principles available at: https://secure-media.collegeboard.org/digitalServices/pdf/ap/comp-sci-principles-draft-cf-final.pdf. While the framework has not yet been mapped to the Common Core State Standards or the Next Generation Science Standards, the CSP course is designed to be the equivalent of an introductory college computing course. The AP Computer Science A (CSA) course has been mapped to the Common Core State Standards for English language arts and Mathematics. A complete description of the alignment between this course and CCSS is available at: http://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2011-8-common-core-state-standards-alignment-advanced-placement.pdf.

Title and source of technical skill standards:

Computer Science Teachers Association Standards (CSTA):

The Computer Science Standards provide a comprehensive set of standards for K-12 computer science education designed to strengthen computer science fluency and competency throughout primary and secondary schools. The standards are written in response to the pressing need to provide academic coherence between coursework and the rapid growth of computing and technology in the modern world, alongside the need for an educated public that can utilize and build that technology most effectively for the benefit of society. The standards have been vetted by dozens of partners at the national level through the CTSA standards taskforce. For more information on CSTA, please visit the link above.

International Society for Technology in Education (ISTE) Standards:

The ISTE Standards are the standards for learning, teaching, and leading in the digital age and are widely recognized and adopted worldwide. The ISTE Standards for Students are used to evaluate the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. The standards have been vetted by hundreds of partners at the national level. For more information on the ISTE standards, please visit the link above.

Each of the courses within the Computer Science program of study have been benchmarked to the CSTA and ISTE standards. To review the standards alignment for the Exploring Computer Science (ECS) curriculum, please visit: http://pact.sri.com/. To review the standards alignment for the AP Computer Science Principles (CSP) course, please visit:

https://secure-media.collegeboard.org/digitalServices/pdf/ap/comp-sci-principles-draft-cf-final.pdf. To review the standards alignment for the AP Computer Science A (CSA) course, please visit: http://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2011-8-common-core-state-standards-alignment-advanced-placement.pdf

Title and source of workplace or other skill standards, as applicable:

Common Career Technical Core (CCTC)

The Common Career Technical Core (CCTC) are national standards for Career & Technical Education (CTE) that help to inform the establishment of state standards and/or programs of study. The CCTC were developed by educators, school administrators, representatives from business and industry, faculty from higher education, as well as workforce and labor markets economists. The CCTC include a set of standards for each of the sixteen (16) Career Clusters and the corresponding Career Pathways that help to define what students should know and be able to do after completing instruction in a program of study. For more information on the CCTC, please visit the link above.

Within the Computer Science program of study, the CCTC standards for the Information Technology Career Cluster as well as the Science, Technology, Engineering & Mathematics (STEM) Career Cluster have been embedded in each course. The program has students apply the CCTC Information Technology standards, specifically the Programming & Software Development Career Pathway standards as well as the STEM standards, specifically the Engineering & Technology Career Pathway standards.

Career Ready Practices (CRP)

The Career Ready Practices (CRP) are a component of the CCTC framework and includes twelve (12) statements that address the knowledge, skills, and dispositions that are important to becoming career ready. The CRP describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline, or level of education and should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a career pathway. For more information on the CRP, please visit the link above.

Within the Computer Science program of study, the CRP statements are embedded throughout the program to ensure students display the appropriate workplace and soft skills required to be successful in a career.

EARLY CAREER AND EARLY COLLEGE OPPORTUNITIES

Identify CTE program of study early career opportunities, industry-recognized certifications and licenses, options for early college credit, two- and four-year degree and certification program alignment, and the technical skill attainment measures for the program of study. *Attach articulation/dual enrollment agreement(s).*

Describe early career opportunities (i.e. work-based learning experiences and industry-mentored projects):

In the Computer Science program of study, students are asked to use computational practices such as algorithm development, problem solving and programming within the context of problems that are relevant to their lives. They are also introduced to topics such as interface design, limits of computers, as well as societal and ethical issues. Students explore a range of careers in information technology and computer science as they learn to connect their informal knowledge, technology skills, and beliefs about computing to the theoretical and foundational tenets of computer science. Students apply math and science to hands-on projects. They explore the roles of computer scientists as they study the required technical skill set, soft skills, educational pathways, and ongoing training required for computing careers. Students examine computing problems that are culturally-relevant, and address social and ethical issues while engaging in several in-depth projects to demonstrate the real-world applications of computing. Schools will offer a minimum of three courses: Exploring Computer Science (ECS), AP Computer Science Principles (CSP), and AP Computer Science A (CSA). Work-based learning experiences and industry-mentored projects are included in each course and will be reviewed with the Local Education Agency (LEA) Program Advisory Council to further identify opportunities to engage the community.

List industry-recognized certifications and/or licenses, as appropriate (include the partner organization and credential):

The College Board provides college approved assessments which are known as Advanced Placement Exams for participating students. The College Board will report valid and reliable scores on overall student performance for each assessment taken in connection with a completed Advanced Placement course. The Advanced Placement assessment(s) give students an objective evaluation of their achievement and stakeholders the opportunity to obtain and use data to make informed decisions. Advanced Placement assessments are available for all College Board approved Advanced Placement courses.

Describe early college credit options (i.e. advanced placement, dual enrollment, transcripted and/or articulated credit, credit by exam, pre-apprenticeship, other) and options for two- and four-year degree and/or certification program alignment (attach articulation/dual enrollment agreement). The partner organization and hours of credit earned should be included, as applicable:

The College Board partners with a broad range of colleges and universities across the country to recognize and reward the great work being accomplished in AP courses. Each college and university will make its own decisions about awarding credit and placement and most have a written policy earned credit for a given AP Exam, the amount of credit awarded, and how credits are applied. Opportunities for students typically include earned college credit, scholarships, and placement. For more information on the College Board, please visit the link above.

Delaware students receiving a score of 4 or higher on the AP Computer Science A assessment, who have completed and passed pre-calculus and who have illustrated college readiness in math and ELA can receive advanced credit for CIS120—Introduction to Programming (4 Credits) at **Delaware Technical and Community College**. This course is offered in the following AAS degree programs:

- Computer Information Systems
- Computer Network Engineering

- Information Security
- Web Development

Delaware students who complete and pass Exploring Computer Science AND AP Computer Science Principles, who have completed and passed pre-calculus and who have illustrated college readiness in math and ELA can receive advanced credit for CSCI-110 Computational Thinking I (2 Credits)— at **Delaware State University**. This course is offered in the following BS degree programs:

- Information Technology
- Computer Science

Delaware students receiving a score of 4 or higher on the AP Computer Science A assessment, who have completed and passed pre-calculus and who have illustrated college readiness in math and ELA can receive advanced credit for CSCI-120 Elements of Computer Programming I (4 Credits) at **Delaware State University**. This course is offered in the following BS degree programs:

- Information Technology
- Computer Science

Delaware students receiving a score of 5 on the AP Computer Science A assessment can receive advanced credit for CISC101 Principles of Computing (3 Credits) at the **University of Delaware**.

Delaware students completing the Computer Science Program of Study can receive advanced credit for SEC100 – Introduction to Computer Hardware and Operation (3 credits), SEC290 – Introduction to Programming with Python (3 credits), and a computer science elective at **Wilmington University.** These courses are offered as part of the following degree and certificate programs:

- Computer and Network Security
- Software Design and Development
- Digital Evidence Discovery Certificate
- Digital Evidence Investigation Certificate

The Department of Education is currently negotiating articulation agreements with the University of Delaware.

List technical skill attainment measures for the program of study (i.e. industry recognized certification or license, advanced placement, dual enrollment, transcripted and/or articulated credit, dual enrollment, credit by exam):

☐ Certification/credentialing exam (specify):

☐ Licensing exam (specify):

☒ Nationally recognized exam (specify):
Advanced Placement – Computer Science Principles
Advanced Placement – Computer Science A

☒ Advanced standing (specify):
Delaware Technical Community College:
CIS120—Introduction to Programming

Delaware State University:
CSCI-110 Computational Thinking I
CSCI-120 Elements of Computer Programming I
Wilmington University:
SEC100 - Introduction to Computer Hardware and Operation
SEC 290 - Introduction to Programming with Python
Computer Science Elective
University of Delaware:
CISC101 – Principles of Computing

☐ Other (specify):

POS OVERVIEW, COURSE DESCRIPTIONS, END-OF-COURSE, AND PROGRAM ASSESSMENTS

Provide a CTE program of study overview that broadly describes the program and student expectations. Identify end-of-program assessment(s) and opportunities for students to participate in early college and early career experiences. List each course title in the CTE program of study. Provide an overview of each course and define what students should know and be able to demonstrate upon completion of each level. Identify appropriate end-of-course assessment(s).

CTE Program of Study Overview:

The Computer Science program of study is a three (3) course Career & Technical Education (CTE) instructional program that engages students in open-ended problem solving where students study computational practices such as algorithm development, problem solving and programming within the context of problems relevant to their everyday lives. They are also introduced to topics such as interface design, limits of computers, and societal and ethical issues. The program prepares students for further education and careers in information technology and computer science. The CTE program consists of three courses, Exploring Computer Science (ECS), AP Computer Science Principles (CSP), and AP Computer Science A (CSA).

- **Exploring Computer Science (ECS)** allows students to focus on the conceptual ideas of computing to understand why certain tools or languages might be utilized to solve particular problems. The goal of the course is to develop computational practices of algorithm development, problem solving and programming within the context of relevant and authentic problems. Topics such as interface design, limits of computers, as well as societal and ethical issues are explored.

- **AP Computer Science Principles (CSP)** allows students to understand the real-world impact of computing applications and programming literacy using a multidisciplinary approach. Students are introduced to creative aspects of programming, using abstractions and algorithms, working with large data sets, understandings of the internet and issues of cybersecurity, as well as impacts of computing that affect different populations. CSP gives students the opportunity to use current technologies to solve problems and create meaningful computational artifacts.

- **AP Computer Science A (CSA)** allows students to solve problems, work with design strategies and methodologies, organize data through data structures, apply data processing techniques, analyze

potential solutions, and investigate ethical and social implications of computing. The course emphasizes both object-oriented and imperative problem solving and design using Java language. The CSA course curriculum is compatible with many CS1 courses at the college and university level.

End-of-Program Assessment(s):

☐ Certification/credentialing exam (specify):
☐ Licensing exam (specify):
☒ Nationally recognized exam (specify):
College Board Assessment – AP Computer Science Principles and AP Computer Science A
☐ Other (specify):

Course title:

Exploring Computer Science (ECS)

Course description (include prerequisites):

The Exploring Computer Science (ECS) curriculum is to develop students' abilities to apply computational thinking and algorithm development. Students apply problem solving skills and programming language to situations that are relevant in their lives. Students are introduced to topics such as interface design, limits of computers, as well as societal and ethical issues.

Prerequisite or Concurrent Enrollment Requirement: Algebra I

Course knowledge and skills (what students will know and be able to do):

By the end of this course students will:

1. Analyze the characteristics of hardware components; use appropriate tools and methods for internet searches; evaluate the results of web searches and the reliability of information found on the internet; explain the differences between tasks that can and cannot be accomplished with a computer; analyze the effects of computing on society within economic, social, and cultural contexts; communicate legal and ethical concerns raised by computer innovation; and explain the implications that computing-enabled innovation have had on communication and data exchange to as well as the impact on society.

2. Name and explain the steps used in solving problems; apply appropriate problem-solving techniques; express a solution using standard design tools; determine if a given algorithm successfully solves a stated problem; create algorithms that meet specified objectives; explain the connections between binary numbers and computers; summarize the behavior of an algorithm; compare the tradeoffs between different algorithms for solving the same problem; and explain the characteristics of problems that cannot be solved by an algorithm to apply a variety of problem-solving techniques for creating solutions to problems that are situated in a variety of contexts requiring abstract thinking.

3. Create webpages with a practical, personal, and/or societal purpose; select appropriate techniques when creating webpages; use abstraction to separate style from content in webpage design and

development; and describe the use of a website with appropriate documentation by assuming the role of a developer by expanding the knowledge of algorithms, abstraction, and webpage design and applying it to the creation of webpages and documentation for users and equipment.

4. Design, code, test, and execute a program that corresponds to a set of specifications; select appropriate programming structures; locate and correct errors in a program; explain how a particular program functions; justify the correctness of a program; and create programs with practical, personal, and/or societal intent to create programming solutions to a variety of computational problems using an iterative development process.

5. Describe the features of appropriate data sets for specific problems; apply a variety of analysis techniques to large data sets; use computers to find patterns in data and test hypotheses about data; compare different analysis techniques and discuss the tradeoffs among them; and justify conclusions drawn from data analysis to use computers to translate, process and visualize data in order to find patterns and test hypotheses.

6. Identify the criteria that describe a robot and determine if something is a robot; match the actions of the robot to the corresponding parts of the program; build, code, and test a robot that solves a stated problem; explain ways in which different hardware designs affect the function of a machine; and describe the tradeoffs among multiple ways to program a robot to achieve a goal to integrate hardware and software in order to solve problem.

7. Describe ways in which computing enables innovation; discuss the ways in which innovations enabled by computing affect communication and problem solving; analyze how computing influences and is influenced by the cultures for which they are designed and the cultures in which they are used; analyze how social and economic values influence the design and development of computing innovations; discuss issues of equity, access, and power in the context of computing resources; communicate the legal and ethical concerns raised by computational innovations; discuss privacy and security concerns related to computational innovations; and explain positive and negative effects of technological innovations on human culture to recognize the ethical and social implications of computer science and its products.

End-of-Course Assessment(s):

- ☒ Teacher designed assessment
- ☐ LEA designed assessment
- ☐ Certification/credentialing exam (specify):
- ☐ Licensing exam (specify):
- ☐ Nationally recognized exam (specify):
- ☒ Other (specify): Unit and Summative Assessments are provided by SRI International at http://pact.sri.com

Course title:

AP Computer Science Principles (CSP)

Course description (include prerequisites):

The Advanced Placement (AP) Computer Science Principles (CSP) course is intended to engage students in the computer science discipline and prepare a pipeline of STEM majors by focusing on the creative aspect of computing and computational thinking. Students will experience how computing impacts their everyday lives and create artifacts with practical, personal, or societal intent. Further, students will collaborate with others to pose problems, develop projects, implement solutions and evaluate outcomes. The course promotes student innovation and exploration related to computer science.

Prerequisite: Exploring Computer Science (ECS)

Course knowledge and skills (what students will know and be able to do):

By the end of this course, students will:

1. Identify impacts of computing; describe connections between people and computing; and explain connections between computing concepts to recognize implications for individuals, society, commercial markets, and innovation due to developments in computing.

2. Create an artifact with a practical, personal, or societal intent; select appropriate techniques to develop a computational artifact; and use appropriate algorithmic and information-management principles to design and develop interesting computational artifacts and apply computing techniques to creatively solve problems.

3. Explain how data, information, or knowledge are represented for computational use; explain how abstractions are used in computation or modeling; identify abstractions; and describe modeling in a computational context to develop models and simulations of natural and artificial phenomena, use them to make predictions about the world, and analyze their efficacy and validity.

4. Evaluate a proposed solution to a problem; locate and correct errors; explain how an artifact functions; and justify appropriateness and correctness to design and produce solutions, models, and artifacts, and evaluate and analyze computational work.

5. Explain the meaning of a result in context; describe computation with accurate and precise language, notation, or visualization; and summarize the purpose of a computational artifact to describe computation and the impact of technology and computation, explain and justify the design and appropriateness of computational choices, and analyze and describe both computational artifacts and the results or behaviors of such artifacts.

6. Collaborate with another student in solving a computational problem; collaborate with another student in producing an artifact; share the workload by providing individual contributions to overall collaborative effort; foster a constructive collaborative climate by resolving conflicts and facilitating the contributions of a partner or team member; exchange knowledge and feedback with a partner or a team member; and review and revise work as needed to create a high quality artifact to learn

to collaborate effectively including drawing on diverse perspectives, skills, and backgrounds of peers to address complex and open-ended problems.

End-of-Course Assessment(s):

- ☐ Teacher designed assessment
- ☐ LEA designed assessment
- ☐ Certification/credentialing exam (specify):
- ☐ Licensing exam (specify):
- ☒ Nationally recognized exam (specify):
  College Board – AP Computer Science Principles Exam
- ☐ Other (specify):

Course title:

AP Computer Science A (CSA)

Course description (include prerequisites):

The Advanced Placement (AP) Computer Science A (CSA) course emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development. The course includes the study of data structures, design, and abstraction. A large part of the course is built around the development of computer programs that correctly solve a given problem, while developing the use of logic and formal methods of programming.

Prerequisites: Exploring Computer Science (ECS) and AP Computer Science Principles (CSP)

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Course knowledge and skills (what students will know and be able to do):

By the end of this course, students will be able to:

1. Design, implement, and analyze solutions to problems; use and implement commonly used algorithms; and use standard data structures to specify and design a program that is understandable and can be adapted to changing circumstances.

2. Develop and select appropriate algorithms and data structures to solve new problems; and write solutions fluently in an object-oriented paradigm to state solutions in a precise form that invites review and analysis.

3. Write, run, test, and debug solutions in the Java programming language, utilizing standard Java library classes and interfaces from the AP Java subset to implement solutions in a standard programming language to reinforce concepts, allow potential solutions to be tested, to encourage discussion of solutions and alternatives, as well as examine and test programs to determine whether they correctly meet their specifications.

4. Read and understand programs consisting of several classes and interacting objects; and read and understand a description of the design and development process leading to a program to recognize and analyze the structure/function and efficiency of a given program.

5. Investigate legal issues and social and ethical ramifications of computer use to understand the ethical and social implications of computer use.

6. The goals of the AP Computer Science A course are comparable to those in the introductory course for computer science majors offered in many college and university computer science departments.

End-of-Course Assessment(s):

- ☐ Teacher designed assessment
- ☐ LEA designed assessment
- ☐ Certification/credentialing exam (specify):
- ☐ Licensing exam (specify):
- ☒ Nationally recognized exam (specify): College Board AP Computer Science A Exam
- ☐ Other (specify):

PROGRAM OF STUDY CURRICULUM

Identify the method of technical and academic curriculum development (adopted, adapted, or developed in accordance with guidance from the program advisory committee).

POS technical and academic curriculum will be:

- ☒ Adopted (specify source): State-model program of study
- ☐ Adapted (specify source):
- ☐ Developed locally (describe):
- ☐ Other (specify):

TEACHER CERTIFICATION

Provide valid teacher certification(s), candidate experience, pre-requisite and requisite licensure or certification requirement(s) for POS teachers.

POS teacher requirements include:

- ☒ Teacher certification(s) (list): Mathematics Education (Secondary); Science Education (Secondary); Business Education with emphasis on computer technology; Technology Education with emphasis on computer technology; or Skilled and Technical Sciences (STS) Programming and Software Development
- ☒ Candidate experience (describe): Candidate may have experience with computer theory, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. A candidate in this arena understands the principles of computational science, computer development and programming, and can adapt applications to use in a variety of situations. For more information, please see the Bureau of Labor Statistics: computer and information research scientists.
- ☐ Pre-requisite professional licensure or certification requirement(s) (list):
- ☐ Requisite professional licensure or certification requirement(s) (list):
- ☐ Other (describe):

VALUE-ADDED OPPORTUNITIES

List extended early career and college credit opportunities available during the student's senior year. Document transition services, cooperative learning experiences, additional dual enrollment, or other.

Opportunities for extended and accelerated learning include:

- ☐ Cooperative education (describe):
- ☐ Structured internship (describe):
- ☐ Dual enrollment (list):
- ☐ Advanced Placement (list):
- ☐ Transition services (describe):
- ☐ Other (describe):

CAREER AND TECHNICAL STUDENT ORGANIZATIONS

Indicate the Career and Technical Student Organization (CTSO) affiliation by checking the appropriate box.

- ☐ BPA
- ☐ TSA

PROGRAM OF STUDY MATRIX

Complete the program of study matrix to demonstrate the alignment of academic and technical courses, culminating early career and/or early college experiences. Identify appropriate certification and licensure options, opportunities for obtaining early college credit (courses with articulated or dual enrollment credit agreements should be appropriately designated within the matrix), the post-secondary program sequence, and potential career options. *Attach the Program of Study Matrix*.

Access the Program of Study Matrix.

DEPARTMENT OF EDUCATION PROGRAM OF STUDY APPROVAL		
The following section will be completed by staff from the Delaware Department of Education, CTE & STEM Office and reported to the LEA as part of the CTE program of study approval process.		
Date Delaware CTE Program of Study Application Received:		
Local Education Agency (LEA): **School(s):**		**Program of Study Start Date:**
LEA CTE Coordinator Name:	**Phone:**	**E-Mail Address:**
Career Cluster & Code: Information Technology / 11	**Career Pathway & Code:** Programming and Software Development / 11.04	**Program of Study Title & Code:** Computer Science / 11.04601
CTE Program of Study Course Titles, Course Codes, and Funding Levels: 1. Exploring Computer Science (ECS) / 11.0460111 / 1 2. AP Computer Science Principles (CSP) / 11.0460122 / 3 3. AP Computer Science A (CSA) / 11.0460133 / 3		
CTE Concentrator/Completer Course Titles: Concentrator Course: AP Computer Science Principles (CSP) Completer Course: AP Computer Science A (CSA)		
CTE Program of Study Request: ☒ State-model CTE Program of Study ☐ Local CTE Program of Study		
CTE Program of Study Attachments: ☒ Labor Market Information (LMI) Review; ☒ Articulation/Dual Enrollment Agreement(s); and ☒ Program of Study Matrix.		
DDOE CTE & STEM Director Signature:		Date:
DDOE Chief Academic Officer Signature:		Date: