

K-12 Computer Science Guidance



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**Department of
Education &
Workforce**

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Introduction

This document serves as a quick reference guide for the K-12 Computer Science Content area. For more information, please contact the Ohio Department of Education and Workforce at 1-877-644-6338 or email at computerscience@education.ohio.gov.

Computer Science (CS) Legislation

House Bill 33

Ohio [House Bil 33](#) passed in July 2023, including computer science legislation:

1. **Computer Science License for Industry Professionals** – HB33 requires the State Board of Education to adopt rules to create a computer science teaching license for industry professionals to teach computer science to specific grades. The holder of a computer science teaching license for industry professionals shall be limited to teaching forty hours in a week in the subject area of computer science ([Ohio Revised Code 3309.236 \(E\)](#)).
2. **Computer Science Licensure Bands** – Computer science licenses will specify whether the educator is licensed to teach grades kindergarten through twelve (K-12), pre-kindergarten through five (PK-5), grades four through nine (4-9), or grades seven through twelve (7-12) ([Ohio Revised Code 3319.236 \(F\)](#)).
3. **Teach CS Grants** – To support computer science growth in Ohio, the Ohio Department of Higher Education has established the "Teach CS" grant program to fund coursework, materials, and exams to support the increasing number of existing teachers who qualify to teach computer science ([Ohio Revised Code 3333.129](#)).
4. **CS Promise** – Beginning with the 2024-2025 school year, under the program, a student in any of grades seven through twelve who is a resident of this state may, at no cost to the student, enroll in and receive high school credit for one computer science course per academic year that is not offered by the student's public or nonpublic secondary school, provided the student is accepted into an eligible course offered by an approved provider and there are sufficient funds to support enrollment ([Ohio Revised Code 3322.20](#)).

House Bill 110

Ohio [House Bill 110](#), passed in July 2021, including computer science legislation:

1. **Update Standards and Model Curriculum** – Requires the Ohio Department of Education to update the [Ohio Learning Standards](#) and [Model Curriculum](#) within one year of the effective date of HB110 ([Ohio Revised Code 3301.079\(A\)\(4\)](#)).
2. **State Committee on Computer Science** – Requires that no later than thirty days after the effective date of this legislation, the Department, in consultation with the Chancellor of Higher Education, shall establish a committee to develop a state plan for computer science education not later than one year after the effective date of the legislation for the purposes of primary and secondary education ([Ohio Revised Code 3301.23\(A\)](#)).

3. **Data Collection and Reporting Requirement** – Requires the state plan for computer science include a requirement that the Department collect any data regarding computer science courses offered by school districts and school buildings operated by school districts, including the names of the courses and whether the courses were developed using the standards and model and post the collected data on its website ([Ohio Revised Code 3301.23\(D\)\(2\)](#)).
4. **Advanced computer science as unit for admission** – Beginning with the 2022-2023 academic year, each state university shall recognize the successful completion of a course in advanced computer science in high school, as described in the standards adopted pursuant to [Ohio Revised Code 3345.063 \(A\)\(4\)](#), as a unit for admission to the university.

House Bill 170

Ohio [House Bill 170](#), effective March 2018, included five changes to the Ohio prescribed curriculum. The law:

1. **Create Standards and Model Curriculum** – Requires the Ohio Department of Education to create [computer science standards](#) and [model curriculum](#) for grades K-12 ([Ohio Revised Code 3301.079 \(A\)\(4\)](#)).
 - a. Development of the Ohio Learning Standards and Model Curriculum for Computer Science were adopted by the State Board of Education in December 2018 for implementation in the 2019-2020 (FY 2020) school year.
2. **Legal Definition of Computer Science** – Provides a definition for computer science that includes “logical reasoning, computing systems, networks and the internet, data and analysis, algorithms and programming, impacts of computing and structured problem-solving skills applicable in many contexts from science and engineering to the humanities and business” ([Ohio Revised Code 3301.012](#)).
3. **Using CS to Satisfy Requirements for High School Graduation** – Permits credit in *advanced computer science* to satisfy Algebra 2/Math 3 or its equivalent mathematics curriculum requirement for high school graduation ([Ohio Revised Code 3313.603\(C\)\(3\)](#)).

Permits credit in *advanced computer science* to satisfy an advanced science (excluding biology or life science) curriculum requirement for high school graduation ([Ohio Revised Code 3313.603 \(C\)\(5\)](#)).

4. **Eligibility Verification Form** – Extends, through FY2025, the provision allowing an individual holding a valid educator license in any grades K-12 to teach a computer science course if, prior to teaching the course, the individual completes a professional development program approved by the district superintendent or school principal that provides content knowledge specific to the course the individual will teach.
5. **CS Licensure Requirements** – Stipulates the licensure requirements for educators who teach computer science courses ([Ohio Revised Code 3319.236](#)).

Temporary Law: Computer Science Licensure for 2024-2025

[Ohio House Bill 33](#) section 610.120 extends the provision allowing an individual holding a valid educator license in any grades K-12 to teach a computer science course if, prior to

teaching the course, the individual completes a professional development program approved by the district superintendent or school principal that provides content knowledge specific to the course the individual will teach.

The superintendent or principal shall approve any professional development program endorsed by the organization that creates and administers the national Advanced Placement examinations as appropriate for the course the individual will teach.

Beginning July 1, 2025, a school district or public school shall permit an individual to teach a computer science course only in accordance with section [3319.236 of the Ohio Revised Code](#).

Teachers and districts have until Dec. 31 to submit the [Computer Science Eligibility Verification Form](#) to take advantage of this temporary law for the year.

Report of the State Committee on Computer Science

As part of the requirements of House Bill 110, the Department of Education in partnership with the Ohio Department of Higher Education was required to create a [plan for computer science education](#). This report was finalized Aug. 30, 2022, and is available on the [Department website](#).

Standards and Model Curriculum

[Ohio law](#) mandated creation of Ohio's [Learning Standards](#) and [Model Curriculum](#) for Computer Science in 2017. The original Standards and Model Curriculum was adopted in 2018. In 2021, [Ohio law](#) mandated a revision of the standards and Model Curriculum for Computer Science. The revised standards were adopted by the Ohio State Board of Education in July 2022 followed by the model curriculum in September 2022.

The Ohio Learning Standards for Computer Science define what students should know and be able to do, and the Model Curriculum provides clarity to the standards as well as information to help educators plan and implement their local curricula. The law does not mandate that districts include these standards in any school offering or provide a curriculum that addresses these standards ([Ohio Revised Code 3301.079 \(A\)\(4\)](#)).

Choosing EMIS Subject Codes

Districts may use names for courses that are different from the course names shown in the Education Management Information System (EMIS). When recording courses in EMIS, districts must select the subject codes of the courses that match the content of their own courses. Brief descriptions of each course below will help districts determine the best matches for the courses they offer.

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K-8 CS Courses

101355 ROBOTICS K-8

Students engage in a design process to manage and control devices through investigative and exploration activities. Products of student work in robotics may be descriptive and/or functional models of technology applications. Students will apply the knowledge and skills necessary to program and operate robots. The students will learn robotic operations and system configurations. Students will code and debug programs using the robotic programming language. This course can also serve as a computer science course.

290245 COMPUTER SCIENCE K-8

Includes content in the appropriate grade range portion of Ohio's Learning Standards for Computer Science.

High School CS Courses

101350 ROBOTICS

Application of processes and knowledge in the design, development, and use of systems to manage and control devices. Products of student work in robotics may be descriptive and/or functional models of technology applications across all systems areas.

290160 WEBSITE DEVELOPMENT

This course includes planning, designing, and coding webpages to create dynamic, usable websites. Content includes web programming using common design tools, e.g., HTML, XML, CSS, web-based editors. Students study and use web-based protocols, e.g., SFTP, TCP/IP, HTTP, HTTPS. In addition, content includes using tag elements, working with graphics, hypertext links, graphical tables, and accessibility methods including Universal Design.

290170 NETWORKING

In this course, students understand the concepts and use of network servers and devices (e.g., host, firewall, router, switch). Students understand the advantages and disadvantages of network models (e.g., peer-peer, client-server). Content addresses network design fundamentals including network type (e.g., LAN, WAN, MAN). Students also learn the application of network topologies (e.g., Star, bus, hybrid). At an advanced level, students design and build simple networks, understand server virtualization, and network security.

290180 COMPUTER SERVICE

This course includes configuration, troubleshooting, and repair of network hardware, clients, and peripherals. In addition, content should include installation of operating systems including updates, computer security, and customer service.

290200 COMPUTER PROGRAMMING

This course includes the study and use of programming languages (e.g., C++, C#, Java, Python).

290250 COMPUTER SCIENCE*

In this course, students develop an understanding of how computing is used to solve problems and enable innovation across fields and how these solutions can impact society. Students explore using computational thinking skills and tools to solve problems and create artifacts. Effective communication and collaboration skills are developed as students work individually and in group explorations.

**This course is typically reported as advanced when reported as Advanced Placement (AP) Computer Science Principles.*

290310 COMPUTER SCIENCE WITH IN-DEPTH STUDY*

This course addresses computer science topics that include problem solving strategies, organization of data, algorithmic thinking and programming, analysis of potential solutions, and the impacts of computing. The course provides the opportunity for a more in-depth study of selected computer science content.

**This course is typically reported as advanced when reported as Advanced Placement (AP) Computer Science A.*

290325 SPECIFIC TOPICS IN COMPUTER SCIENCE

This course provides a focused examination of specific computer science topics.

299999 OTHER COMPUTER SCIENCE

A high school level course that addresses content from the 9-12 section of Ohio's Learning Standards for Computer Science and is different in scope from any of the other Subject Codes described above.

Using a Computer Science Course to Satisfy Ohio Graduation Requirements

[Ohio law](#) allows a student to use a computer science course to satisfy credit for mathematics, advanced mathematics, or advanced science courses. It also allows students to use a coding course to satisfy Foreign (World) Language credit in schools that require Foreign (World) Language credit for graduation. Courses in computer science provide an alternative way for students to demonstrate what they know and can do. This option also will support students who plan to enter specialized careers that draw on knowledge and skills learned in computer science courses.

Districts record credits for computer science using the appropriate computer science subject codes in EMIS. Graduation credits are recorded in the Core area of EMIS. Each district is responsible for tracking how students fulfill graduation requirements. Ohio encourages districts to have a system in place for recording transcript credit(s) in computer science whenever applied toward the fulfillment of credit(s) for graduation.

NOTE: A student may satisfy only two of the four required mathematics graduation credits with credit in computer science.

Using EMIS Course Level Element Field

EMIS allows districts to designate up to seven levels for each course. These are levels I-V, Advanced, and Intervention. The levels allow districts to use the same subject codes for different course offerings. For example, a district can identify a single computer science course as an intervention, introductory, or advanced course. You can find more information on the [EMIS Course Level Element field in Section 4.2 of the EMIS Manual](#).

To be considered at an advanced level, a computer science course must:

- Include Ohio's 9-12 *advanced-level* standards; and
- Be recorded as *advanced* in the EMIS Course Level Element field (CN080).

Applying Credit in Computer Science to Satisfy a Mathematics Credit

A student may use credit in a computer science course to satisfy a mathematics credit. To do so, the course must address high school mathematics standards and focus on the study of, or usage of, algorithms for problem solving. A course that focuses only on learning a computer language without application and analysis does not qualify for mathematics credit. The district chooses the content and standards associated with each course and determines whether each course complies with these guidelines. Find additional guidance at [Requirements for Mathematics Courses Beyond Geometry/Mathematics 2](#).

Applying Credit from an Advanced Computer Science Course to Satisfy Credit for Algebra 2/Math 3 or Its Equivalent

A student may choose to apply one credit of *advanced computer science* to satisfy the requirement of one unit of Algebra 2/Math 3 or its equivalent. Only credit in an *advanced computer science* course can be used to satisfy the Algebra 2/Math 3 or its equivalent graduation requirement in mathematics.

An *advanced computer science course* must address standards in the grades 9-12 *advanced section* of Ohio's Learning Standards for Computer Science and must be recorded as *advanced* in the EMIS Course Level Element field (CN080).

NOTE: A single credit in *advanced computer science* may only be used to satisfy one Algebra 2/Math 3 or equivalent, **or** an advanced science (excluding Biology or Life Sciences) credit.

NOTE: When students choose to take advanced computer science to satisfy the credit for Algebra 2/Math 3 or equivalent, the school must communicate that some institutions of higher education may require Algebra 2/Math 3 or equivalent for the purpose of college admission. Also, the parent, guardian, or legal custodian of each student who chooses to take advanced computer science in lieu of Algebra 2/Math 3 or equivalent must sign and submit to

the school a statement acknowledging that not taking Algebra 2/Math 3 or equivalent may negatively affect college admission decisions ([ORC 3313.603 \(C\)\(3\)](#)).

The Department provides an [Advanced Computer Science Checklist](#) template for districts. This documents how they have notified parents, guardians, or legal custodians of any adverse effects students could experience regarding college admissions or entry into a program of study when using computer science or advanced computer science to satisfy graduation requirements.

NOTE: Ohio high school graduates who choose to participate in intercollegiate athletics should refer to the [NCAA rules](#) for details on how using credit in *advanced computer science* to satisfy Algebra 2/Math 3 may affect their eligibility.

Applying Credit from an Advanced Computer Science Course to Satisfy Credit for an Advanced Science Course

A student can choose to apply one credit in *advanced computer science* to satisfy the requirement of one unit of advanced science (excluding Biology or Life Sciences). An advanced science course builds on the content in Physical Science and Biology in Ohio's Learning Standards for Science. Physical Science and Biology are foundational courses for high school science. Computer science may not replace these courses.

NOTE: The requirement to earn a physical science credit and a life science credit must be met by science courses. A school cannot use computer science courses to satisfy either of these requirements for a student. A school can use an advanced computer science course only to satisfy the requirement that a student earn a third science credit in an advanced science course.

NOTE: A single credit in *advanced computer science* may only be used to satisfy a credit in an advanced science course (excluding Biology or Life Sciences) or Algebra 2/Math 3.

NOTE: Only a computer science course addressing standards in the grades 9-12 advanced section of Ohio's Learning Standards for Computer Science and recorded as advanced in the EMIS Course Level Element field (CN080) can satisfy the required credit of an advanced science course.

Applying Credit in Computer Science to Satisfy Foreign (World) Language Credit

If a school district or chartered nonpublic school requires a foreign language as an additional graduation requirement under [Ohio Revised Code 3313.603 \(E\)](#), a student may apply one unit of instruction in computer coding to satisfy one unit of foreign language. If a student applies more than one computer coding course to satisfy the foreign language requirement, the courses shall be sequential and progressively more difficult.

Using Computer Science for Admission to a State University

[House Bill 110](#) included legislation addressing using computer science for admission to a state university.

Beginning with the 2022-2023 academic year, each state university shall recognize the successful completion of a course in *advanced* computer science in high school, as described in the standards adopted pursuant to division (A)(4) of section 3301.079 of the Revised Code, as a unit for admission to the university, as follows:

- (1) The state university shall recognize one unit of advanced computer science as one unit toward meeting a general mathematics requirement, as determined by the university if the student used that advanced computer science unit to meet the mathematics curriculum requirement under division (C)(3) of section 3313.603 of the Revised Code.
- (2) The state university shall recognize one unit of advanced computer science as one unit toward meeting a general science requirement, as determined by the university, if the student used that advanced computer science unit to meet the science curriculum requirement under division (C)(5) of section 3313.603 of the Revised Code.
- (3) The state university shall recognize one unit of advanced computer science as one unit toward meeting a general elective requirement, as determined by the university if the student used the advanced computer science unit to meet the curriculum requirement under division (C)(8) of section 3313.603 of the Revised Code.
- (4) The state university shall recognize one unit of computer coding as one unit toward meeting a general foreign language requirement, as determined by the university if the student used the computer coding unit to meet a school district's or school's foreign language curriculum requirement as described in division (E) of section 3313.603 of the Revised Code.

Technology Seal

Students in the classes of 2023 and beyond (those who entered grade 9 on or after July 1, 2019) are now required to meet a new set of [graduation requirements](#). One of these new graduation requirements is *Demonstrating Readiness* by earning two [Graduation Seals](#).

The Technology Seal is a state-defined seal. Students who earn Ohio's Technology Seal will understand the global impact of technology and use it to design solutions and communicate ideas. Students will earn the Technology Seal by demonstrating knowledge and skills on Advanced Placement and International Baccalaureate courses and tests, through College Credit Plus coursework, or by completing a qualifying technology course. More information and guidelines are available on the [Technology Seal Page](#).



Qualifications to Teach Computer Science

Teachers can qualify to teach computer science in several ways. The three most common pathways are to:

- Hold a full teaching license in computer science;
- Hold a computer technology endorsement and have successfully passed the [Ohio Computer Science Assessments for Educators \(OAE\) exam](#) (currently OAE #054); or
- Hold a full teaching license in any area and add computer science through a [supplemental pathway](#) that includes passing the [computer science OAE exam](#).

Computer Science Licensure Banding – HB33 (F) Licenses issued under this section shall specify whether the educator is licensed to teach grades kindergarten through twelve, pre-kindergarten through five, grades four through nine, or grades seven through twelve.

Alternative Pathway – Under the [alternative pathway](#) (which would be considered full licensure), an individual must hold a 2.5 undergraduate GPA, complete coursework at an Intensive Pedagogical Training Institute (IPTI) or an approved training institute, and receive a passing score on the OAE exam.

Additional Licenses – There are three additional licenses available to individuals who do not hold a professional or alternative license:

- **The 12-hour Teaching Permit** allows an individual to teach up to 12 hours a week. Applicants must hold a baccalaureate, master's, or doctoral degree or show evidence of significant experience, verified by the employing district, in the subject to be taught.
- **The 40-hour STEM School Teaching Permit** allows an individual to teach up to 40 hours a week at a Science Technology Engineering Math (STEM) designated school. Applicants must hold a baccalaureate, master's, or doctoral degree or show evidence of significant experience, verified by the employing district, in the subject to be taught.
- **The 40-hour Computer Science Teaching Permit** allows an individual to teach up to 40 hours a week in the subject area of computer science.

Teaching Advanced Placement (AP) Computer Science Courses – To teach an AP computer science course, in addition to holding a proper license, an individual must complete a professional development program endorsed or provided by the organization that creates and administers national advanced placement examinations. For this purpose, the individual may complete the program at any point during the calendar year.

For more information on licensure, please contact the State Board of Education Office of Educator Licensure at 855-983-4868 or email at Educator.Licensure@SBOE.ohio.gov.