

# Computer Science Curriculum and Licensure Guidelines

## Contents

Introduction .....	2
Choosing EMIS Subject Codes .....	3
Using EMIS Course Level Element Field.....	3
Using a Computer Science Course to Satisfy Ohio Graduation Requirements .....	3
Applying Credit in Computer Science to Satisfy a Mathematics Credit .....	4
Applying Credit from an Advanced Computer Science course to Satisfy Credit for Algebra 2/Math 3 or equivalent .....	4
Applying Credit from an Advanced Computer Science course to Satisfy Credit for an Advanced Science Course.....	4
Using Coding Courses to Satisfy Foreign (World) Language in Schools that Require Foreign (World) Language for Graduation .....	6
Qualifications to Teach Computer Science.....	6

## Introduction

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

1. Requires the Ohio Department of Education to create [computer science standards](#) and [model curriculum](#) for grades K-12 ([ORC 3301.079 \(A\)\(4\)](#)).
2. Provides a state 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.” ([ORC 3301.012](#))
3. Permits credit in *advanced computer science* to satisfy the Algebra 2/Math 3 or its equivalent mathematics curriculum requirement for high school graduation ([ORC 3313.603 \(C\)\(3\)](#)).
4. Permits credit in *advanced computer science* to satisfy an advanced science (excluding biology or life science) curriculum requirement for high school graduation ([ORC 3313.603 \(C\)\(5\)](#)).
5. Stipulates the requirements for licensure for educators who teach computer science courses ([ORC 3319.236](#)).

Development of the [Ohio Learning Standards](#) and [Model Curriculum](#) for Computer Science is complete. The State Board of Education adopted the standards and model curriculum in December 2018 for implementation in the 2019-2020 (FY2020) school year.

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 ([ORC 3301.079 \(A\)\(4\)](#)).

## Temporary Law

### Computer Science Licensure for FY2020 and FY2021

[Ohio House Bill 166](#) Section 733.61 permits an individual who holds a valid educator license in any of grades seven through twelve 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, 2021, 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 Revised Code.

## Computer Science Supplemental License Reimbursement

House Bill 166 of the 133rd General Assembly includes a provision to reimburse teachers for the costs to obtain licenses to teach computer science. This provision includes \$1.5 million in support for the next two years (FY 2020 and 2021). This allows currently licensed teachers to apply for reimbursement of the coursework and content testing fees necessary to obtain a supplemental license to teach computer science.

Awards made by the Ohio Department of Education are in the form of reimbursements paid directly to educators for the cost of the [content examination](#) and pedagogy courses required by [Ohio Revised Code](#) that are completed by the summer term of 2021.

There is more information available on the [Computer Science Supplemental License Reimbursement](#) on the Ohio Department of Education Website.

## Choosing EMIS Subject Codes

Districts may use names for courses that are different from the course names shown in 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.

## 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 Course Master Record section [EMIS Manual section 4.2](#).

To be considered 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).

## Using a Computer Science Course to Satisfy Ohio Graduation Requirements

[State law](#) permits schools to allow a student to use a computer science course to satisfy credit for mathematics, advanced mathematics or advanced science courses. It also allows for 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 transcribed credit(s) in computer science whenever they apply it 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.

### APPLYING CREDIT IN COMPUTER SCIENCE TO SATISFY A MATHEMATICS CREDIT

A student may use a 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 on the requirements for mathematics courses beyond Geometry/Math 2 in the [Requirements for Mathematics Courses Beyond Geometry/Mathematics 2](#) document.

### APPLYING CREDIT FROM AN ADVANCED COMPUTER SCIENCE COURSE TO SATISFY CREDIT FOR ALGEBRA 2/MATH 3 OR EQUIVALENT

A student may choose to apply one credit of *advanced computer science* to satisfy one unit of Algebra 2/Math 3 or equivalent. Only credit in an *advanced computer science* course can be used to satisfy the Algebra 2/Math 3 or 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 document containing 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 to document how they have notified parents, guardians or legal custodians of any adverse effects their students could experience on college admissions, or entry into a program of study, when they use 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 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.

## Using Coding Courses to Satisfy Foreign (World) Language in Schools that Require Foreign (World) Language for Graduation

If a school district or chartered nonpublic school requires a foreign language as an additional graduation requirement under division (E) of this section, 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.

## Qualifications to Teach Computer Science

Teachers can qualify to teach computer science in several ways ([ORC 3319.236](#)).

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 [computer science Ohio 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](#) ([OAC 3301-24-14](#)) that includes passing the [computer science OAE exam](#).

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

### Additional Licenses

There are two 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 at least 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 STEM designated school. Applicants must hold at least a baccalaureate, master's or doctoral degree, or show evidence of significant experience, verified by the employing district, in the subject to be taught.

**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.