

Division VIII of Title 5 of the California Code of Regulations Proposed Amendments to Title 5 of the California Code of Regulations Pertaining to the Supplementary Authorization in Computer Science

Initial Statement of Reasons

Rationale for Proposed Regulations

The proposed regulations implement, interpret, and make specific Education Code section 44256 pertaining to requirements for supplementary authorizations.

This rulemaking action proposes amendments to Title 5 of the California Code of Regulations related to the Supplementary Authorization in Computer Science as approved by the Commission at the June 2015 meeting. The proposed regulations change the name of the Supplementary Authorization in Computer Concepts and Applications (CCA) to Computer Science and specify the required content areas of study educators must complete to obtain the Supplementary Authorization in Computer Science. The proposed regulations also include general cleanup of sections that refer to options to obtain supplementary authorizations that are no longer available.

General Provisions

Supplementary Authorizations are limited subject area authorizations for departmentalized instruction that may be added to a general education teaching credential (i.e., Multiple Subject, Single Subject, or older equivalent). Supplementary Authorizations are based on the completion of coursework (20 lower division or 10 upper division/graduate semester units) in the subject area from a regionally accredited college or university. These authorizations and the units required are specified in statute. The Commission establishes the specific content areas of study for the coursework that must be completed within regulations.

The proposed amendments to regulations reflect a change in focus for the Supplementary Authorization in CCA from content preparation for teaching basic computer use, keyboarding, and software applications to more relevant 21st century content inclusive of the range of Computer Science courses taught in California public schools. The proposed amendments include revised Content Areas of Study for the Supplementary Authorization in order to serve as a basis for increasing the capacity of teachers prepared to provide instruction in the range of K-12 Computer Science courses in California public schools. The proposed regulations also include changing the name of the Supplementary Authorization in CCA to Computer Science as well as general clean-up of outdated language within the same sections of these regulations.

Proposal for a Supplementary Authorization in Computer Science

Over the past year, Commission staff has engaged in a series of conversations with representatives from the Alliance for California Computing Education for Students and Schools (ACCESS) and the Computer Science Teachers Association (CSTA) about the current preparation

and authorizations for teaching the range of K-12 Computer Science classes in California schools. It is important to note that what is encompassed by the discipline of Computer Science for K-12 students has changed. The broad Scope of Computer Science today is reflected in the following definition:

Computer Science is the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, and their impact on society.¹

At the February 2015 Commission meeting (<http://www.ctc.ca.gov/commission/agendas/2015-02/2015-02-6B.pdf>), it was discussed how coursework offered in Computer Science in California public schools has evolved rapidly in recent years while the required Content Areas of Study for the Supplementary Authorization in CCA have remained the same since first developed in 1987.

To address concerns that educators receive the appropriate preparation to teach a range of relevant computer science courses to California students beyond basic computer functions and applications, Commissioners provided staff direction to bring forward proposed amendments to Title 5 regulations pertaining to the Supplementary Authorization in CCA.

At the June 2015 meeting (<http://www.ctc.ca.gov/commission/agendas/2015-06/2015-06-7B.pdf>), the Commission took action to approve proposed amendments to Title 5 regulations pertaining to the Supplementary Authorization in CCA to strengthen the required Content Areas of Study for the Supplementary Authorization and to change the name of the Supplementary Authorization to Computer Science.

The proposed regulations strengthen the required Content Areas of Study for the Supplementary Authorization to ensure holders have the requisite content knowledge to teach the scope of Computer Science classes now offered in California public schools. To reflect the broader approach to this content area, the proposed regulations include changing the name of this Supplementary Authorization to Computer Science.

California Education Code section 44256 specifies the types of supplementary authorizations that may be added to elementary and secondary teaching credentials, grade level limitations, and the units required so those specific elements remain the same as the current requirements. However, this section of statute also provides that the Commission, by regulation, may require evidence of additional competence as a condition for instruction in particular subjects.

The chart below provides the scope of the current Supplementary Authorizations in CCA and Content Areas of Study now required and the proposed modifications for the new Supplementary Authorizations in Computer Science, in the far right-hand column indicated by underlined text.

¹ CSTA K-12 Computer Science Standards, 2011, <http://www.csta.acm.org/Curriculum/sub/K12Standards.html>

Authorization	Unit Requirements	Content Areas of Study- Computer Concepts and Applications	
		Current	Proposed
<p><i>Introductory Supplementary Authorization</i></p> <ul style="list-style-type: none"> Listed on Multiple Subject/Elementary Credentials for teaching grades 9 and below Listed on Single Subject/Secondary Credentials for teaching curriculum level grade 9 and below; students may be in grades K-12 	<p>20 Semester Units¹ or 10 Semester Units of Upper Division or Graduate Level Coursework</p>	<p>Requires coursework covering each content area:³</p> <ul style="list-style-type: none"> software evaluation and selection hardware operation and functions² classroom uses of computers 	<p>Requires coursework covering each content area:³</p> <ul style="list-style-type: none"> computational thinking computing practice and programming computers and communication devices impacts of computing⁴ (e.g., social, ethical, legal)
<p><i>Specific Subject Supplementary Authorization</i></p> <ul style="list-style-type: none"> Listed only on Single Subject/Secondary Credentials for teaching content in grades K-12 	<p>20 Semester Units¹ or 10 Semester Units of Upper Division or Graduate Level Coursework</p>	<ul style="list-style-type: none"> Specific Subject Supplementary Authorizations have no required content areas. All coursework must fall within the academic department for the subject category. 	<p>Requires coursework covering each content area:³</p> <ul style="list-style-type: none"> computer programming data structures and algorithms digital devices, systems and networks software design impacts of computing⁴ (e.g., social, ethical, legal)

¹ All lower division units or a combination of upper and lower division units.

² An Introduction to Data Processing may be used for hardware operations and functions. Java, Cobol, Basic, and Pascal are examples of computer languages and do not apply to hardware but are acceptable as electives toward the overall unit requirement.

³ The balance of the units may be in any course that falls within the academic department for that subject category. Computer classes in the Education Department may be used **including a pedagogy course in computer science from either department.**

⁴ These topics may be included within courses covering the other content areas.

For the Introductory Supplementary Authorization in Computer Science, coursework completed must cover the following content areas:

- Computational thinking:** involves solving problems and designing systems, using fundamental computing concepts such as decomposition, data representation, generalization/abstraction, and algorithms.
- Computing practice and programming:** includes expertise in at least one block--- based, visual (drag-and-drop) programming language (e.g., Alice, Blockly, Kodu, Logo, Scratch, Snap!) or a modern, high-level programming language.
- Computer and communications devices:** covers the major components and functions of digital devices and the computing systems they compose.

- **Impacts of computing:** includes the social and ethical issues and impacts of computing, as well as the contributions of computer science to innovations in other fields. These topics may be included within courses covering the other content areas.

For the Specific Supplementary Authorization in Computer Science, coursework completed must cover the following content areas:

- **Computer Programming:** includes expertise in at least one modern, high-level programming language (e.g., Python, Java, C/C++/C#).
- **Data structures and algorithms:** covers data representation, abstraction, searching and sorting in the context of solving problems using programming and computational tools.
- **Digital devices, systems and networks:** covers computer and communication devices and the systems they compose, including the concepts and abstractions that enable stand-alone, networked, and mobile digital devices to operate and communicate.
- **Software design:** covers the process of planning, engineering and implementing a software system to solve a problem, typically using both a design and a programming methodology, such as object-oriented and functional approaches.
- **Impacts of computing:** includes the social, ethical, and legal issues and impacts of computing, as well as the contributions of computer science to current and future innovations in the arts, business, humanities, medicine, and science. These topics may be included within courses covering the other content areas.

The Content Areas of Study coursework requirements for the Supplementary Authorization in CCA currently in regulations specifies coursework in content that has now become primarily addressed within the preliminary preparation program standards for all general and special education teaching credentials (i.e., software evaluation and selection, hardware operation and functions, and classroom uses of computers) in Program Standard 11: Using Technology in the Classroom (*Appendix A* in June agenda item 7B). The proposed modifications shown to the Content Areas of Study for the Supplementary Authorization in Computer Science reflect a more comprehensive preparation with direct relevance to the range of K-12 Computer Science courses offered in California public schools today.

The chart also includes as approved at the June 2015 meeting bifurcation of the required Content Areas of Study for both Introductory and Specific Subject Supplementary Authorizations in Computer Science. Presently, the holder of a Single Subject Teaching Credential may only obtain the Specific Subject Supplementary Authorization in CCA, which authorizes departmentalized teaching in the subject area in grades K-12 but does not require any specific Content Areas of Study within the semester units completed. As some Single Subject Credential holders with the Supplementary Authorization are teaching at the elementary and middle school level, the addition of an Introductory Supplementary Authorization in this content area for these teachers provides more flexibility to choose the level of Supplementary Authorization (Introductory or Specific) that is most appropriate and

clarifies the coursework appropriate to each level. This additional option provides for a thorough but introductory level of content for teaching computer science intended for students through grade 9 and also aligns with the Content Areas of Study coursework requirements for holders of a Multiple Subject Credential teaching computer science to students in the same grade levels.

As specified in statute, all teachers who are currently authorized to teach the range of courses in Computer Science will remain authorized (e.g., holders of a Supplementary Authorization in CCA or a Single Subject teaching credential in Mathematics, Business, or Industrial Technology Education) even if the proposed amendments are adopted within regulations.

Only teachers initially earning one of these supplementary authorizations in the future would be required to satisfy the revised Content Areas of Study and be issued the Supplementary Authorization in Computer Science. The proposed regulations include an effective date of April 1, 2016 in order to provide transition time for teachers currently pursuing a Supplementary Authorization in CCA.

Non-Substantive Changes

The proposed regulations include non-substantive changes in 5 CCR sections 80057 and 80089 such as the removal of options to obtain supplementary authorizations that have expired and updating of sections referencing examinations previously used to verify qualifications for supplementary authorizations in languages other than English that have expired and have been replaced with new examinations.

Proposed Amendments to Regulation

Summary of Proposed Amendments

80057.5

(b)(1): Proposes deletion of outdated information that refers to examinations no longer administered and no longer valid for certification use. Proposes adding passage of the appropriate the CSET examinations as the current examinations valid for certification that may be used as verification of proficiency for individuals seeking certification in a language other than English.

(b)(2): Proposes deletion of outdated information that refers to examinations no longer administered and no longer valid for certification use. Proposes adding information regarding the current language assessments approved for certification use may be used as verification of proficiency for individuals seeking certification in a language other than English.

(b)(3): Proposes deletion of outdated information no longer used for certification. Proposes adding updated information that possession of a degree from a foreign institution where instruction was provided solely in the target language may be used as verification of proficiency for individuals seeking certification in a language other than English.

(b)(4): Proposes deletion of outdated information that refers to programs no longer available for certification use. Proposes adding language that the assessment currently used in bilingual programs approved by the Commission may be used as verification of proficiency for individuals seeking certification in a language other than English.

(c)(4): Proposes changing the name of the supplementary authorization from Computer Concepts and Applications to Computer Science to more accurately reflect the content to be taught under the revised supplementary authorization. Proposes deletion of the current content areas of study as insufficient to meet the educational needs of today's student population. Proposes new content areas of study required to obtain the revised Computer Science supplementary authorization so educators will be sufficiently prepared to provide meaningful instruction to California students.

(f): Proposes deleting the text currently in subsection (f) as it will be moved to subsection (g) to retain a logical order of the subsections listing the requirements for the supplementary authorization. Proposes adding definitions of the course content required to align with the proposed modifications in changing the Computer Concepts and Applications supplementary authorization to Computer Science.

(g): Proposes adding the text previously found in subsection (f) to subsection (g) to retain a logical order of the subsections listing the requirements for the supplementary authorization. Proposes deleting the language previously found in subsection (g) as it refers to an option that has expired and no longer available to individuals seeking a supplementary authorization.

(h): Proposes the addition of subsection (h) to provide a date of April 1, 2016 as transition time for implementation of the new requirements. This will provide some leeway for individuals who may be in the middle of completing the current requirements for the supplementary authorization in CCA when the regulations approve and not force anyone to have to change in mid-stream, which would likely create an unfair burden by costing them additional money and time.

80089

Proposes deleting subsection (c) as it refers to an option that has expired and is no longer available to individuals seeking a supplementary authorization.

80089.1

(a): Proposes changing the name of the supplementary authorization listed as Computer Concepts and Applications to Computer Science to more accurately reflect the content in the proposed amendments to the content areas of study and coursework required to obtain the supplementary authorization. Proposes removing one of the instances of the subject area Metals (Industrial Arts) from the list of specific supplementary authorizations as duplicative.

(e): Proposes the addition of subsection (e) to provide definitions for the course content required to obtain the supplementary authorization in Computer Science. Previously, there

were no defined courses to obtain the specific supplementary authorization in Computer Concepts and Applications, providing no guarantee that there would be consistency in the preparation educators teaching this content would receive and thus no way to assure students received instruction relevant to their academic needs. The proposed definitions for the new content areas of study required to obtain the revised Computer Science supplementary authorization will assure educators are sufficiently prepared to provide meaningful instruction to California students.

(f): Proposes the addition of subsection (f) to provide a date of April 1, 2016 as transition time for implementation of the new requirements. This will provide some leeway for individuals who may be in the middle of completing the current requirements for the supplementary authorization in CCA when the regulations approve and not force anyone to have to change in mid-stream, which would likely create an unfair burden by costing them additional money and time.

80089.2

(a)(1): Proposes deletion of outdated information that refers to examinations no longer administered and no longer valid for certification use. Proposes adding passage of the appropriate the CSET examinations as the current examinations valid for certification that may be used as verification of proficiency for individuals seeking certification in a language other than English.

(a)(2): Proposes deletion of outdated information that refers to examinations no longer administered and no longer valid for certification use. Proposes adding information regarding the current language assessments approved for certification use may be used as verification of proficiency for individuals seeking certification in a language other than English.

(a)(3): Proposes deletion of outdated information no longer used for certification. Proposes adding updated information that possession of a degree from a foreign institution where instruction was provided solely in the target language may be used as verification of proficiency for individuals seeking certification in a language other than English.

(a)(4): Proposes deletion of outdated information that refers to programs no longer available for certification use. Proposes adding language that the assessment currently used in bilingual programs approved by the Commission may be used as verification of proficiency for individuals seeking certification in a language other than English.

(b)(13): Proposes changing the word “on” to “one” to correct a typographical error.

(b)(14): Proposes the addition of subsection (14) to add an Introductory Supplementary Authorization in Computer Science for Single Subject Credential holders. The addition of this new option provides Single Subject Credential holders the flexibility to pursue both content levels of the supplementary authorization content for those who may be teaching Computer Science at the elementary and middle school levels.

(e): Proposes the addition of subsection (e) to provide definitions for the course content required to obtain the supplementary authorization in Computer Science. The proposed definitions for the new content areas of study required to obtain the revised Computer Science supplementary authorization will assure educators are sufficiently prepared to provide meaningful instruction to California students.

(f): Proposes the addition of subsection (f) to provide a date of April 1, 2016 as transition time for implementation of the new requirements. This will provide some leeway for individuals who may be in the middle of completing the current requirements for the supplementary authorization in CCA when the regulations approve and not force anyone to have to change in mid-stream, which would likely create an unfair burden by costing them additional money and time.

Documents Relied Upon in Preparing Regulations:

February 2015 Commission agenda item 6B:

<http://www.ctc.ca.gov/commission/agendas/2015-02/2015-02-6B.pdf>

June 2015 Commission agenda item 7B:

<http://www.ctc.ca.gov/commission/agendas/2015-06/2015-06-7B.pdf>

Economic Impact Assessment/Analysis

Education Code section 44225 authorizes the Commission to adopt the proposed regulation addition. The proposed amendments implement, interpret, and make specific Education Code section 44256 pertaining to supplementary authorizations.

The purpose of the proposed regulations is as follows:

- change the name of the Supplementary Authorization in Computer Concepts and Applications to Computer Science
- specify the required content areas of study educators must complete to obtain the Supplementary Authorization in Computer Science
- general cleanup of sections that refer to options to obtain supplementary authorizations that are no longer available.

In accordance with Government Code section 11346.3(b), the Commission has made the following assessments regarding the proposed regulation amendments:

Creation or Elimination of Jobs Within the State of California

The proposed amendments pertain to applications for teaching credentials that authorize service in California’s public schools. The proposed amendments will not create or eliminate jobs in California.

Creation of New or Elimination of Existing Businesses Within the State of California

The proposed amendments pertain to applications for teaching credentials that authorize service in California’s public schools. The proposed amendments will not create or eliminate existing businesses in California.

Expansion of Businesses or Elimination of Existing Businesses Within the State of California

The proposed amendments pertain to applications for teaching credentials that authorize service in California’s public schools. As a result of the proposed amendments, no existing businesses in California will be expanded or eliminated.

Benefits of the Regulations

The Commission anticipates that the proposed amendments will benefit the welfare of students attending public schools in the State of California by assuring individuals seeking to teach Computer Science have completed the comprehensive preparation required to provide meaningful instruction in the range of K-12 Computer Science courses available in California public schools. The proposed regulations will promote fairness and prevent discrimination by ensuring uniformity in the requirements individuals must meet to obtain the Supplementary Authorization in Computer Science. The Commission does not anticipate that the proposed regulations will result in the protection of public health and safety, worker safety, or the environment, the prevention of social inequity or an increase in openness and transparency in business and government.

Consideration of Alternatives

In accordance with Government Code section 11346.5, subdivision (a)(13), the Commission must determine that no reasonable alternative considered by the agency or that has otherwise been identified and brought to the attention of the agency would be more effective in carrying out the purpose for which the action is proposed, would be as effective as and less burdensome to affected private persons than the proposed actions, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provision of law. The Commission invites interested persons to present statements or arguments with respect to alternatives to the proposed regulations during the written comment period or at the public hearing.

Evidence Relied Upon to Support the Initial Determination That the Regulation Will Not Have a Significant Adverse Economic Impact on Business: The proposed regulations will not have a significant adverse economic impact upon business. The proposed regulations apply only to individuals seeking credentials that authorize service in California’s public schools.