COMPUTER SCIENCE EDUCATOR (Ed 612.33/507.54c)

Reviewer Assessment

***Directions****: This matrix should be completed by the reviewer while assessing the program standards’ compliance through review of the matrix submitted by the institution and data gathering at the site visit.*

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| **Computer Science Educator** | **Rating:****4: Highly effective****3: Effective****2: Needs improvement****1: Ineffective** | **Describe the rationale for the rating and comment on how the program provides evidence and data to address the standard and inform continuous improvement. Indicate the relationship to Ed 610.02 Professional Education standards (if any).** |
| The program for computer science shall provide the candidate with the skills, competencies, and knowledge through a combination of academic and supervised practical experiences as outlined in Ed 507.54(c). |
| (a) To be certified computer science educator for grades K-12, the candidate shall:(1) Haveat least a bachelor’s degree; and |
| (c) A candidate for certification as a computer science educator for grades K-12 shall have the following skills, competencies, and knowledge through a combination of learning activities such as but not limited to academic and supervised field-based experience in the following areas: |
|  (1) In the area of impacts of computing, the candidate shall have the ability to: |
| a. Use computing to:(i) Express creativity;(ii) Solve problems;(iii) Communicate; (iv) Collaborate; and (v) Innovate in a variety of fields and careers; |  |  |
| b.  Assess obstacles to equal access to computing as well as the impacts of these obstacles; |  |  |
| c. Assess impacts of computing innovations and practices with respect to:(i) Beneficial and harmful effects;(ii) Ethical practices; and(iii) Privacy, security, and legal issues; |  |  |
| d. Keep current with knowledge on emerging technologies and their potential impacts. |  |  |
| (2) In the area of algorithms and computational thinking, the candidate shall have the ability to: |
| a. Analyze algorithmic processes and develop algorithms using:(i) Pattern recognition;(ii) Problem decomposition; and(iii) Abstraction; |  |  |
| b. Convert between binary, decimal, and hexadecimal number systems; |  |  |
| c. Use different formats to represent, develop and analyze algorithms including, but not limited to natural language, flowcharts, and pseudocode; |  |  |
| d. Use heuristic solutions to address computing limitations including, but not limited to, time, space, and solvability; |  |  |
| e.  Use standard algorithms including, but not limited to, searching and sorting algorithms and analyze implementations of those algorithms for correctness, efficiency, and clarity; and |  |  |
| f. Use simple recursive algorithms including, but not limited to, fractals, Zeno’s paradox, and Towers of Hanoi; |  |  |
| (3) In the area of programming, the candidate shall have the ability to: |
| a. Write and modify computer programs in block-based and at least one text-based programming language; |  |  |
| b. Analyze computer programs in terms of:(i) Correctness;(ii) Usability;(iii) Readability; (iv) Extensibility;(v) Modifiability; and(vi) Reusability; |  |  |
| c. Program using the following elements:(i) Basic control structures;(ii) Standard operators;(iii) Variables and data types;(iv) Functions; and(v) Data structures; |  |  |
| d. Write event-driven programs that respond to external events including, but not limited, to sensors, messages, and clicks; |  |  |
| e. Use libraries and APIs; |  |  |
| f. Use and evaluate multiple development and execution environments; |  |  |
| g. Facilitate collaboration in the development of software; |  |  |
| h. Program user interactions with graphical and other user interface components; |  |  |
| i. Demonstrate knowledge of various software development models; |  |  |
| j. Model practices in software development, including:(i) User requirements analysis;(ii) Program design;(iii) Implementation and documentation; (iv) Testing and debugging; and (v) Evolution driven by feedback. |  |  |
| k. Develop object-oriented programs; |  |  |
| l. Model the process of program compilation and interpretation. |  |  |
| (4) In the area of data and analysis, the candidate shall have the ability to: |
| a. Model concepts of processing data, including:(i) Encoding (ii) Compression (iii) Encryption |  |  |
| b. Create and use models and simulations. |  |  |
| c. Work with data using computational tools, including to:(i) Collect, aggregate, and generate;(ii) Store, manage, and manipulate; (iii) Process, analyze, visualize, and |  |  |
| (5) In the area of computing systems and networks, the candidate shall have the ability to: |
| a. Evaluate and compare computing systems using various criteria. |  |  |
| b. Model computing systems in terms of:(i) Hardware and software abstraction layers; and (ii) Computer program execution (fetch-decode-execute cycles); |  |  |
| c.  Evaluate and compare local, network, and cloud computing and storage; |  |  |
| d. Model computer networks in terms of:(i) Protocol stack components; and(ii) Network protocols, such as, transmission control protocol/internet protocol (TCP/IP), domain name servers (DNS), and hypertext transfer protocol secure (HTTPS); |  |  |
| e. Demonstrate fundamental concepts of cybersecurity including, but not limited to, confidentiality, integrity, availability, non-repudiation, and authentication. |  |  |

[*Source.*](http://www.gencourt.state.nh.us/rules/Filing_history/sourceed.html) *#12419, eff 11-14-19*