

Amend Ed 505.05(a)(2), effective 9/16/2011 (Doc #9992), by inserting (a)(2)c. so that Ed 505.05 (a) intro., Ed 505.05(a)(1), (a)(2) intro., and (a)(2) a., b., and c. are cited and read as follows:

Ed 505.05 Alternative 5: Site-Based Certification Plan.

(a) The site-based certification plan shall be available in elementary and secondary teaching areas, excluding career and technical specialty certification under Ed 507.03 and special education, for those individuals who qualify under the following specific conditions:

(1) The applicant shall possess a bachelor's degree from an institution approved by the New Hampshire postsecondary education commission or equivalent regional accrediting agency such as but not limited to the Northeast Regional Association of Schools and Colleges;

(2) The applicant shall meet one of the following criteria:

a. For secondary education, the applicant shall possess at least 30 credit hours in the subject to be taught and an overall grade point average of at least 2.5, or equivalent; or

b. For elementary education, applicants shall have successfully completed courses in mathematics, English, social studies, and science with an overall grade point average of at least 2.5, or equivalent; or

c. For computer science education, applicants shall:

1. Possess at least 30 credit hours in the subject to be taught and an overall grade point average of at least 2.5; or

2. Have a current computer science major assignment, as determined by the bureau of credentialing, during or after the 2014/2015 school year and prior to June 30, 2019, and have applied for a computer science education credential during that time period;

Adopt Ed 507.52 to read as follows:

Ed 507.52 Computer Science Educator

(a) To be certified computer science educator for grades K-12, the candidate shall:

(1) Have at least a bachelor's degree; and

(2) Obtain certification through one of the alternatives in Ed 505.01 – Ed 505.05 after having met the requirements of (c) below:

(b) For candidates seeking certification through an alternative 3, 4 or 5 pathway, the department of education shall assess the skills, competencies, and knowledge of candidates for certification as computer science educators by reviewing evidence, such as, but not limited to, college course work, documented professional experience, letters of recommendation, professional development hours or CEU's, and artifacts of professional practice.

(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.

Adopt Ed 612.23 to read as follows:

Ed 612.33 Computer Science Education. 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 507.52(c).

**Appendix I**

<b>Rule</b>	<b>Statute</b>
Ed 505.05(a) intro., (a)(1), (a)(2) intro., (a)(2) a., b., & d.	RSA 21-N:9, II(s)
Ed 507.52	RSA 21-N:9, II(s); RSA 186:11, X
Ed 612.33	RSA 21-N:9, II(r)