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### Written and Performance Exam General Overview

- The intent of this exam is to assess your ability to teach the skills found in the Massachusetts Technical Education Framework.
- This exam is aligned to the frameworks which can be accessed [here](#).
- Many questions and tasks require a synthesis of knowledge based on experience in the field and may not be found in any book.
- Candidates are encouraged to prepare for their exam by reviewing textbooks and reference material which has been listed as part of this exam outline. These resources can be found using online search tools, online vendors, and websites.
- Contact the Technical Teacher Testing Office if you need further assistance in locating resources listed in the exam outline.
- Use this exam outline and the Massachusetts Technical Education Framework to focus your preparation for the exam.

### Written Exam

- Number of Questions: 100
- Administration Time: 3 hours
- Administration Method: Remote Proctoring Online Session

### Written Exam Content Coverage

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**15% Fundamentals of Computer Information Technology**

- Explain the role of information technology in the workplace and community.
- Explain concepts fundamental to security.
- Demonstrate concepts fundamental to graphic tools.
- Explain concepts fundamental to networking.
- Explain concepts fundamental to operating systems.
- Explain concepts fundamental to databases.
- Describe and classify computer hardware.
- Explain concepts fundamental to server-side technologies.

**26% Elements of Software Development**

- Demonstrate problem solving and troubleshooting techniques.
- Determine software requirements.
- Create software design.
- Demonstrate software implementation.
- Perform software testing.
- Create user software documentation.
- Publish and maintain software.

**22% Programming Concepts**

- Implement concepts fundamental to programming.
- Demonstrate fundamentals of Object Orientated (OO) Programming.

**30% Web Development Concepts**

- Demonstrate fundamentals of Hypertext Markup Language (HTML).
- Demonstrate fundamentals of cascading style sheets (CSS)
- Demonstrate fundamentals of JavaScript
- PMC
- Construct a website

**5% Programming Math Concepts**

**2% Safety and Health**

**Written Exam Reference Materials (Reference Current Edition)**

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- **Instructors and Their Jobs** by W.R. Miller and M.F. Miller (American Technical Publishers)
- **Improving Student Learning** by Lee Jenkins (ASQC Quality Press)
- **Teaching Your Occupation to Others** by Paul A. Bott, Allyn and Bacon (Pearson College Division)
- **Learning to Program with Alice** by Wanda Dann, Stephen Cooper & Randy Pausch (Pearson Prentice Hall)
- **Programming Logic & Design** by Tony Gaddis (Addison-Wesley)
- **Computer Concepts 2010** by June Jamrich Parsons, Dan Oja, David W. Beskeen, Carol M. Cram, and Jennifer Duffy (Cengage Learning)
- **Object Oriented Systems Design** by Edward Yourdon (Yourdon Press)
- **Software Engineering: A Practitioner's Approach** by Roger S. Pressman (McGraw-Hill)
- **Information Architecture for the World Wide Web** by Peter Morville and Louis Rosenfeld (O'Reilly)
- **Programming PHP** by Rasmus Lerdorf and Kevin Tatroe (O'Reilly Media)
- **Python Programming for the Absolute Beginner** by Michael Dawson (Course Technology Cengage Learning)
- **HTML, XHTML, and XML** by Patrick Carey (Course Technology Cengage Learning)
- **Information Technology Project Management** by Kathy Schwalbe (Thomson Course Technology)
- **Project Management: A Systems Approach to Planning, Scheduling, and Controlling** by Harold Kerzner (Wiley)
- **HTML, JavaScript, and Advanced Internet Technologies Basics** by Karl Barksdale and E. Shane Turner (Cengage Learning)
- **The Media of Mass Communication** by John Vivian (Pearson)
- **JavaScript** by Patrick Carey and Frank Canovatchel (Thomson Course Technology)
- **Succeeding with Technology Computer System Concepts for Real Life** by Ken Baldauf and Ralph M. Stair, (Thomson)
- **Introduction to Computing and Programming in Python A Multimedia Approach** by Mark Guzdial, Pearson College Division
- **Beginning Java Game Programming** by Jonathan S. Harbour (Thomson Course Technology)

- **Head First C#** by Andrew Stellman and Jennifer Greene (O'Reilly Media)
- **Learning Computer Programming: It's Not About Languages** by Mary E. Farrell (Charles River Media, Inc.)

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### Materials Needed for the Written Exam

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- A four-function calculator is included in the online testing system. No other calculators are permitted.
- Scrap paper and pencil/pen are permitted.

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### Written Exam Sample Items

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Each question on the exam consists of one incomplete sentence or question followed by four choices. Some items reference an image or diagram. A few sample items are included below; the correct answer is designated with an asterisk (\*).

When is a fire watch needed?

In computer programming, an array is a(n):

- a. area of storage on a disk.
- b. group of files.
- c. block of memory locations allocated of different data types under one name.
- \*d. a block of memory locations allocated of the same data type under one name.

Applying a style sheet to your Web page or pages is accomplished by adding a \_\_\_\_\_ tag to the head section of your HTML file.

- a. <connect>
- b. <apply>
- \*c. <link>
- d. <new>

## Performance Exam

- Administration Time: 4 hours
- Administration Method: Onsite at an approved Teacher Testing Location

### Performance Exam Content Coverage

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#### 64% Programming and Logic Development

- Create a menu driven application
- Create an interactive application
- Create an application to write to a file
- Incorporate error handling routines
- Produce internal documentation
- Demonstrate iterative loops
- Utilize built-in functions and libraries
- Demonstrate the use of logical operations
- Demonstrate the use of arithmetic operators
- Demonstrate the use of compound conditions
- Demonstrate the use of conditional branching operators
- Demonstrate the use of relational operators
- Produce internal documentation

#### 36% Web Page Development

- Demonstrate the use of tables
- Create absolute and relative hypertext links
- Demonstrate the use of internal and external anchors
- Incorporate an image into a web page
- Incorporate a video clip into a web page
- Demonstrate the use of selectors, declarations, properties, and values
- Create and link an external CSS file to website
- Demonstrate the use of class and id
- Demonstrate the use of relative and absolute positioning
- Demonstrate the use of JavaScript syntax
- Create and link external JavaScript file to website
- Implement a page layout using divs and CSS

## Candidate-Supplied Materials Required for the Performance Exam

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- Face mask (cotton face covering or respirator which fully cover the nose and mouth)

**Note:** No books or notes will be allowed. Cell phones are prohibited during the exam administration.

Candidates will be provided with a personal computer running Windows, HP laser printer, paper, and pencils. A flash drive that contains the necessary files to perform the tests will also be provided to be used to save all work on. The test site will have available the following software applications for your use in developing the Programming and Web Development projects:

- Visual Studio (Visual Basic .Net or C# .Net)
- Notepad
- Internet Explorer
- Google Chrome
- Java Platform Standard Edition
- Eclipse IDE
- WordPad
- Adobe Dreamweaver

You must notify NOCTI no later than two weeks prior to the exam date to indicate which of the software applications listed above you want to use for the exam.

You are not allowed to use any other software applications for this exam. Candidates may not bring their own computer, printer, or any other piece of equipment.

## Onsite Performance Exam Requirements

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- Candidate must practice social distancing and wear the appropriate face covering that covers the nose and mouth while at the exam site.
- Testing sites may have individual requirements based on location and the current guidance from the Center for Disease Control and Prevention (CDC).

## Performance Exam Reference Materials (Reference Current Edition)

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- <https://docs.oracle.com/en/java/>
- <https://docs.microsoft.com/en-us/visualstudio/welcome-to-visual-studio-2015?view=vs-2015>
- <https://www.w3schools.com/>