**What does MTA 98-361 include?**

Understanding core programming (15-20%)

* Understand computer storage and data types
  + How a computer stores programs and the instructions in computer memory, memory stacks and heaps, memory size requirements for the various data storage types, numeric data and textual data
* Understand computer decision structures
  + Various decision structures used in all computer programming languages; If decision structures; multiple decision structures, such as If…Else and switch/Select Case; reading flowcharts; decision tables; evaluating expressions
* Identify the appropriate method for handling repetition
  + For loops, while loops, Do...While loops, and recursion
* Understand error handling
  + Structured exception handling

Understanding object-oriented programming (20-25%)

* Understand the fundamentals of classes
  + Properties, methods, events, and constructors; how to create a class; how to use classes in code
* Understand inheritance
  + Inheriting the functionality of a base class into a derived class
* Understand polymorphism
  + Extending the functionality in a class after inheriting from a base class, overriding methods in the derived class
* Understand encapsulation
  + Creating classes that hide their implementation details while still allowing access to the required functionality through the interface, access modifiers

Understanding general software development (15-20%)

* Understand application life cycle management
  + Phases of application life cycle management, software testing
* Interpret application specifications
  + Reading application specifications and translating them into prototypes, code, select appropriate application type, and components
* Understand algorithms and data structures
  + Arrays, stacks, queues, linked lists, and sorting algorithms; performance implications of various data structures; choosing the right data structure

Understanding web applications (15-20%)

* Understand web page development
  + HTML, Cascading Style Sheets (CSS), JavaScript
* Understand Microsoft ASP.NET web application development
  + Page life cycle, event model, state management, client-side versus server-side programming
* Understand web hosting
  + Creating virtual directories and websites, deploying web applications, understanding the role of Internet Information Services
* Understand web services
  + Web services that will be consumed by client applications, accessing web services from a client application, SOAP and Web Service Definition Language (WSDL)

Understanding desktop applications (15-20%)

* Understand Windows apps
  + UI design guideline categories, characteristics and capabilities of Store Apps, identify gestures
* Understand console-based applications
  + Characteristics and capabilities of console-based applications
* Understand Windows Services
  + Characteristics and capabilities of Windows Services

Understanding databases (15-20%)

* Understand relational database management systems
  + Characteristics and capabilities of database products, database design, Entity Relationship Diagrams (ERDs), normalization concepts
* Understand database query methods
  + Structured query language (SQL), creating and accessing stored procedures, updating data and selecting data
* Understand database connection methods
  + Connecting to various types of data stores, such as flat file; XML file; in-memory object; resource optimization