

## **INEW 2020 Course Syllabus**

**1. Name of Course:** Accessing Data with Microsoft .NET Framework 4

**2. Number of Clock Hours:** 56

### **3. Course Description:**

Students that are familiar with the basics of C# or VB.Net will learn to optimize their designs and develop better performing data access code by using the ADO.NET Entity Framework, LINQ, WCF Data Services, the Sync Framework, XML, and ADO.NET.

Prerequisites: INEW 1071 or equivalent

### **4. Course Objectives**

After completing this course, students will be able to:

- Map entities and relationships by using the Entity Data Model, LINQ to SQL and POCO
- Configure connection strings and providers.
- Configure ADO.NET Data Services.
- Create SQL, LINQ, ESQL, WCF.NET and XML queries
- Create, Update, Delete data with SQL, DataContext,ObjectContext.
- Create and Manage Disconnected and Connected Objects
- Monitor and Collect performance data, Handle exceptions and protect data.
- Deploy and Synchronize ADO.net Components.

### **5. Rationale:**

Upon completion the student will have the knowledge and skills to access data sources using ADO.NET and the .NET Framework.

### **6. Required Materials:**

MCTS Self-Paced Training Kit (Exam 70-516): Accessing Data with Microsoft .NET Framework 4 **ISBN-13:** 978-0735627390

### **7. Evaluation**

Those who participate in class discussions, complete course lab work, and miss no more than three class meetings will be awarded 5.6 continuing education units.

### **8. Course Outline**

Modeling Data (20%)

- Map entities and relationships by using the Entity Data Model.

This objective may include but is not limited to: using the Visual Designer, building an entity data model from an existing database, managing complex entity mappings in EDMX, editing EDM XML, mapping to stored procedures, creating

user-defined associations between entities, generating classes with inheritance and mapping them to tables

This objective does not include: using MetadataWorkspace

- Map entities and relationships by using LINQ to SQL.

This objective may include but is not limited to: using the Visual Designer, building a LINQ to SQL model from an existing database, mapping to stored procedures

- Create and customize entity objects.

This objective may include but is not limited to: configuring changes to an Entity Framework entity, using the ADO.NET EntityObject Generator (T4), extending, self-tracking entities, snapshot change tracking, ObjectStateManager, partial classes, partial methods in the Entity Framework

- Connect a POCO model to the Entity Framework.

This objective may include but is not limited to: implementing the Entity Framework with persistence ignorance, user-created POCO entities

This objective does not include: using the POCO templates

- Create the database from the Entity Framework model.

This objective may include but is not limited to: customizing the Data Definition Language (DDL) (templates) generation process, generating scripts for a database, Entity Data Model tools

- Create model-defined functions.

This objective may include but is not limited to: editing the Conceptual Schema Definition Language CSDL, enabling model-defined functions by using the EdmFunction attribute, complex types

Managing Connections and Context (18%)

- Configure connection strings and providers.

This objective may include but is not limited to: managing connection strings including Entity Framework connection strings, using the ConfigurationManager, correctly addressing the Microsoft SQL Server instance, implementing connection pooling, managing User Instance and AttachDBfilename, switching providers, implementing multiple active result sets (MARS)

This objective does not include: using the SqlConnectionStringBuilder; Oracle data provider; creating and using a custom provider; using third-party providers

- Create and manage a data connection.

This objective may include but is not limited to: connecting to a data source, closing connections, maintaining the life cycle of a connection

- Secure a connection.

This objective may include but is not limited to: encrypting and decrypting connection strings, using Security Support Provider Interface (SSPI) or SQL Server authentication, read only vs. read/write connections

This objective does not include: Secure Sockets Layer (SSL)

- Manage the DataContext andObjectContext.

This objective may include but is not limited to: managing the life cycle of DataContext andObjectContext, extending the DataContext andObjectContext, supporting POCO

- Implement eager loading.

This objective may include but is not limited to: configuring loading strategy by using LazyLoadingEnabled, supporting lazy loading with POCO, explicitly loading entities

- Cache data.

This objective may include but is not limited to: DataContext andObjectContext cache including identity map, local data cache

This objective does not include: Velocity, SqlCacheDependency

- Configure ADO.NET Data Services.

This objective may include but is not limited to: creating access rules for entities, configuring authorization and authentication, configuring HTTP verbs

Querying Data (22%)

- Execute a SQL query.

This objective may include but is not limited to: DBCommand, DataReader, DataAdapters, DataSets, managing data retrieval by using stored procedures, using parameters, System.Data.Common namespace classes

- Create a LINQ query.

This objective may include but is not limited to: syntax-based and method-based queries, joining, filtering, sorting, grouping, aggregation, lambda expressions, paging, projection

This objective does not include: compiling queries

- Create an Entity SQL (ESQL) query.

This objective may include but is not limited to: joining, filtering, sorting, grouping, aggregation, paging, using functions, query plan caching, returning a reference to an entity instance, using parameters with ESQL, functionality related to EntityClient classes

- Handle special data types.

This objective may include but is not limited to: querying BLOBs, filestream, spatial and table-valued parameters

This objective does not include: implementing data types for unstructured data, user-defined types, Common Language Runtime (CLR) types

- Query XML.

This objective may include but is not limited to: LINQ to XML, XmlReader, XmlDocuments, XPath

This objective does not include: XSLT, XmlWriter

- Query data by using WCF.NET Data Services.

This objective may include but is not limited to: implementing filtering and entitlement in WCF.NET Data Services, addressing resources, creating a query expression, accessing payload formats, Data Services interceptors

Manipulating Data (22%)

- Create, update, or delete data by using SQL statements.

This objective may include but is not limited to: Create/Update/Delete (CUD), using DataSets, calling stored procedures, using parameters

- Create, update, or delete data by using DataContext.

This objective may include but is not limited to: CUD, calling stored procedures, using parameters

This objective does not include: ObjectTrackingEnabled

- Create, update, or delete data by usingObjectContext.

This objective may include but is not limited to: CUD, calling stored procedures, using parameters, setting SaveOptions

- Manage transactions.

This objective may include

but is not limited to: System.Transactions, DBTransaction, rolling back a transaction, Lightweight Transaction Manager (LTM)

This objective does not include: distributed transactions, multiple updates within a transaction, multiple synchronization of data within an acidic transaction

- Create disconnected objects.

This objective may include but is not limited to: creating self-tracking entities in the Entity Framework, attaching objects, DataSets, table adapters

Developing and Deploying Reliable Applications (18%)

- Monitor and collect performance data.

This objective may include but is not limited to: logging generated SQL (ToTraceString), collecting response times, implementing performance counters, implementing logging, implementing instrumentation

- Handle exceptions.

This objective may include but is not limited to: resolving data concurrency issues (handling OptimisticConcurrency exception, Refresh method), handling errors, transaction exceptions, connection exceptions, timeout exceptions, handling an exception from the Entity Framework disconnected object, security exceptions

- Protect data.

This objective may include but is not limited to: encryption, digital signature, hashing, salting, least privilege

- Synchronize data.

This objective may include but is not limited to: online/offline Entity Framework, synchronization services, saving locally

- Deploy ADO.NET components.

This objective may include but is not limited to: packaging and publishing from Visual Studio, deploying an ADO.NET Services application; packaging and deploying Entity Framework metadata

This objective does not include: configuring IIS, MSDeploy, MSBuild