Suggested Teaching Guidelines for
Microsoft .NET– PG-DAC February 2020

Duration: 40 class room hrs. + 30 lab hrs (70 Hrs)

Objective: To acquire the knowledge of MS .NET Framework 4.5 or higher version

Prerequisites: Students are expected to have knowledge of COM development and XML

Evaluation method: Theory exam– 40% weightage

Lab exam – 40% weightage

Internal exam– 20% weightage

Note: Training will be carried out on .Net 4.5 or latest version of the software

List of Books / Other Training Material:

Text Book:
1. ASP.Net 4.5 Covers C# and VB Codes: Black Book by Kogent Learning Solutions Inc / Dreamtech Press

Reference books:
1. Beginning ASP .NET 4.5 in C# by Matthew MacDonald/Apress
2. .Net 4.5 Programming 6-in-1: Black Book by Kogent Learning Solution/ Wiley
3. Pro C# 5.0 and the .NET 4.5 Framework by Andrew Troelsen / Apress
4. .NET Programming 4.0, Wrox Publications
5. Introducing Microsoft .NET, Wrox Publications
6. CLR via C# by Jeffrey Ritchter / Microsoft Press
7. Pro C# 2010 And The .NET 4 Platform, Andrew Troelsen
8. C# 2010 Programming: Covers .Net 4.0, Black Book
9. C# 2010 For Programmers, Paul J. Deitel, Harvey M. Deitel
10. Professional ASP.NET MVC 4 Jon Galloway Phil Haack Brad Wilson K. Scott Allen/Wiley
11. Beginning ASP .Net 4.5 in C# and VB by Imar Spaanjaars /Wiley India
12. Pro ASP.Net 4 In C# 2010, Matthew Macdonald, Adam Freeman, Mario Szpuszta
13. Asp .Net MVC Framework by Stephen Walther /Pearson
14. Murach's ASP.NET 4.5 web programming with C# 2012 5th edition by Mary Delamater, Anne Boehm / Shroff Publishers & Distributors
15. Professional ASP.NET 4.5 in C# and VB Gaylord J N / Wiley India Pvt. Ltd

Duration: 10 class room hrs.

Session 1:
Lecture:
- Introduction to .Net Framework
- Difference between .NET 2.0, .NET 3.5 and .NET 4.0/4.5
- .NET Framework Overview
    - ✓ Objectives of .NET Framework 4.5
    - ✓ Components of .NET Framework 4.5
    - ✓ Development in .NET Framework 4.5

Assignment Reading:
    Read about NET 4.5 Framework from MSDN.

Session 2:
Lecture:
- Execution Process in .NET Environment
- Inside .NET Framework

- ✓ CLR
- ✓ Managed and unmanaged code
- ✓ MSIL
- ✓ CTS
- ✓ MetaData
- ▪ JITters

Session 3:
Lecture:

- ▪ Assemblies-The Building Blocks
- ▪ Assembly Benefits
- ▪ Assembly Contents
- ▪ Different between a normal .EXE File and a PE file
- ▪ Search order of an assembly
- ▪ Using reflection to build a dynamically extensible application.
- ▪ Discovering type Defined in an assembly

Assignment Lab:

- ✓ Create a Satellite Assembly in NET 4.5 Framework
- ✓ Create a global Assembly in NET 4.5 Framework

Session 4:
Lecture:

- ▪ Application Domain
  - ✓ Accessing objects Across AppDomain Boundaries
  - ✓ AppDomain Unloading
  - ✓ CLR hosting
  - ✓ How host use AppDomain
  - ✓ Managing CLR by using Managed Code
  - ✓ How a Host Gets its Thread back.
- ▪ Language Interoperability
- ▪ . NET Framework Class Library
- ▪ The IL dis-assembler
- ▪ Migrating to MS .NET

Session 5:
Lecture:

- ▪ Windows Presentation Foundation
- ▪ Windows Workflow Foundation
- ▪ Windows Communication Foundation

Assignment Reading:

Read about WPF, WWF, and WCF from MSDN.

Suggested Teaching Guidelines for
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Duration: 12 class room hrs. + 12 lab hrs

Objective: To acquire the knowledge of C#. NET 4.5

Prerequisites: Knowledge of C++ programming, OOPs, Database Programming and XML is also a must.

Session 1:
Lecture:
- Need of C#
- Strengths of C#
- C# Basics
    - Program Structure
    - Data Types
    - Variables, Constants, Operators
    - Flow Control in C#

Assignment Reading:
Read about C# specification from MSDN.

Assignment Lab:
Write a program in C# to generate prime numbers between 1 and 1000.

Session 2:
Lecture:
- Operators
- Type Safety
- Object Comparison
- Operator overloading
- User defined cast

Assignment Reading:
Read about C# specification from MSDN.

Assignment Lab:
Implement that topics in your program

Session 3:
Lecture:
- Namespaces & Assemblies
- Arrays
    - Simple, multidimensional and jagged array
    - Array class
- Enumerations
- Properties & Indexers

Assignment Reading:
Read about C# specification from MSDN.

Assignment Lab:
Create namespace and assemblies.
Hands on Arrays and properties and indexes

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Session 4:
Lecture:
- Preprocessors
º Preprocessor Usage
  - Conditional Compilation
  - Assemblies
    - What are Manifests??
    - Writing Private Assemblies
    - Writing Shared Assemblies
- Delegates and Events
- Boxing and Unboxing
- Reflection and the Type class

Assignment Reading:
> Read about C# specification from MSDN.

Assignment Lab:
> Work with delegates, events, boxing, unboxing Manifest.

Session 5:
Lecture:
- Regular Expression
- Attributes
- Genetics Concepts
- Generics Collections
  - Collection Interface
  - List, Queues, Stack,
  - Dictionaries, Hash set

Assignment Reading:
> Read about C# specification from MSDN.

Assignment Lab:
> Implement Collections classes in C#

Session 6:
Lecture:
- Error Handling (Exceptions Handling)
  - Checked & Unchecked Statements
  - The try, catch, finally
  - Dos & Don'ts of Exception Handling
- User Defined Exception classes
- WPF
  - XAML & Controls
  - Layouts , Styles , Resources
  - Data Binding
  -

Assignment Reading:
- Read about C# specification from MSDN

Assignment Lab:
> Write a program and do all the exception

Duration: 18 class room hrs + 18 lab hrs

Objective: To acquire the knowledge of ASP.NET 4.5

Prerequisites: Knowledge of COM development, Database Programming and XML is also a must.

Session 1 & 2:
Lecture:

- **Introduction to Asp .net MVC**
  - Architecture of an ASP .Net MVC application
  - Understanding Folder structures and configuration files
- **Understanding Controllers and Action**
  - Create a controller
  - How actions are invoked
  - HttpGet , HttpPost , NoAction Attributes
  - Running Action result.
- **Understanding views & Models**
  - Creating Razor Views
  - HTML Helper Functions
  - Understanding ViewBag
  - Create a view using viewbag

- **Understanding Routing & Request Life Cycle**
  - Routing Engine & Routing Table
  - Understanding and configuring Routing Pattern in RouteConfig File
  - Understanding 404 error and resource not found.
  - Using Attributes Routing
  - Understanding Request Life Cycle

- **Layouts , Bundle , Minification**
  - Creating Layout and using with associated views
  - Understanding Bundling and Minification
  - Using BundleConfig file
  - Attaching css , js , bootstrap in bundles

- **Understanding Models & Views**
  - Creating Models & ViewModel
  - Validation using Data Annotations
  - Client side and server side validation
  - Self validated model
  - Creating Strongly Types Views
  - Using Various Scaffold Templates
  - CRUD operation using Model

- **MVC State Management**
  - ViewBag , TempData , Session , Application
  - Cookies , QueryString

- **MVC Module**
  - Partial View
  - Action Method and child action

- o Custom Helper Function
- o Asynchronous Actions
- o Error Handling in MVC with Log Entry
- o Filters and Custom Action Filter

- **MVC Security**
  - o Using Authorize & Allow Anonymous attributes
  - o Implementing Forms Based Authentication
  - o Preventing Forgery Attack using AntiForgeryToken
  - o Preventing Cross Site Scripting Attack
  - o Intro of OAuth

- **Entity Framework**
  - o Introduction to EF
  - o Different Approaches
  - o Using Code First Approach
  - o Using various Data Annotations
  - o Using Validation, Primary Key , Foreign Key etc
  - o Using Fluent APIs
  - o Database Migrations
  - o Queuing data using Lambda Expression
  - o CRUD operation using EF

- **Developing MVC application using EF Code First Approach**

- **Web APIs**
  - o Creating Web APIs
  - o Different Verbs
  - o Consuming using a client
  - o Using Newtonsoft APIs

- **Understanding ASP.Net MVC Core**
  - o Difference between MVC and MVC Core
  - o Creating a simple MVC Core Application

Session 3:
Lecture
- **Threading**
  - o Threading & Synchronization
  - o Life Cycle of a Thread
  - o Synchronizing critical data using Synchronization objects
  - o Thread Pool
  - o Task Programming using a async & await keyword
- **Querying with LINQ**
  - o LINQ to objects
  - o LINQ to XML
  - o LINQ to SQL

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- **Working with XML and LINQ to XML**
  - Basic of XML
    - XML InfoSet
    - XSD-XML Scheme Definition
    - Editing and XML Schema in Visual Studio 2008/2010
  - XmlReader and XmlWriter
  - XmalDocument and Xpathdocument
  - DataSets
  - The XmalDataSource Control
  - XSLT
  - Database and XML
    - For XML AUTO
    - SQL Server 2008/2012 and XML Data Type
- **Using Lambda Expression**
  - Understanding Lambda Expression
  - Queuing data using Lambda
  - First , Single , where , join , group by etc

Session 4:
Lecture:

- **Data Management with ADO.NET 4.5**
  - Basic ADO.Net features
    - Connection object, Command object, DataReader, DataAdapter, DataSet and DataTable.
  - Asynchronous command Execution
  - Asynchronous Connections

Session 5:
Lecture:
- **Files I/O and Streams**
  - Working with drivers, Directories, and Files
  - Reading and Writing files
  - Working with Serial ports
  - Networks Communications
    - HttpClient API
    - Sending mail
- **WebServices**
  - The Need for Web Services
    - Introducing Web Services
    - The Web Technology Stack and .NET
    - The .NET Alternatives to WebServices
    - Common Web Service Scenarios
  - Implementing a Web Service
    - Creating a Web Service Project

- Implementing Web Service Methods, exposing them and controlling their behavior
- Managing State in an ASP .NET Web Service
- Debugging Web Services

Session 6:
Lecture:
- **Windows Communication foundation**
  - WCF Overview
  - Contracts
    - Service Contracts
    - Data Contracts
    - Message Contracts
  - Channel
    - Channel Shapes
    - Operation Contract and Channel Shapes
    - Channel Listeners
    - Channel Factories
      - ChannelFactory<>
    - ICommunicationObject
  - Binding
    - Cross-Machine Communication Between .NET Applications
    - Local Machine Communication Between .NET Applications
    - Communication Using Basic Web Services
    - Communication Using Advanced Web Services
      - wsHttpBinding
      - ws2007HttpBinding
      - wsDualHttpBinding

Assignment Lab:
- ✓ Creating a simple WCF service

Session 7:
Lecture:
- **Windows Communication foundation**
  - Binding
    - Comparing Binding Performance and Scalability
    - Creating a Custom Binding
      - User-Defined Bindings
    - Binding Element
    - Exposing a Service Contract over Multiple Bindings
  - Behaviors
    - Concurrency and Instancing (Service Behavior)
    - Exporting and Publishing Metadata (Service Behavior)
    - Implementing Transactions (Operation Behavior)
  - Hosting
    - Hosting a Service in Windows Process Activation Services

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- Hosting a Service in IIS 7
- Enabling ASMX Features in an IIS-Hosted Service
- Self-Hosting
- Self-Hosting in a Managed Windows Service
- Hosting Multiple Services in One Process
- Defining Service and Endpoint Addresses

- **Understanding REST Service**
  - Creating REST Service with Get & Post
  - HTML Helper Functions
  - Understanding ViewBag
  - Create a view using viewbag

Assignment Lab:

✓ Create a online shopping portal in ASP.NET and WCF service for communicating between asp.net application and database, Host the WCF service and Asp.NET application on IIS.

Session 8:
Lecture:
- **Localization in MVC**
  - Cultures and regions
    - Understand Culture Type
    - Server side culture declaration
    - Client Side culture declaration
  - Asp .Net 4.5 MVC recourse files
    - Making use of local resources
    - Making use of global resources
  - Looking at the resource editor
- **IIS7**
  - Modular Architecture of IIS7
  - IIS7 and asp .net Integrated pipeline
  - Building a customized Web Server
  - IIS Manager
    - Application pool, web sites, delegation
  - Deploying a Simple Site
- **Deploying ASP .NET MVC application**
  - Configuring IIS for ASP .Net MVC
  - Mixing ASP .net Web Form and Asp .net MVC
  - Bin Deploying an Asp .NET MVC application

Assignment Lab:

✓ Create a Virtual directory for an ASP .NET 4.5 MVC application
✓ Create a simple Currency Converter web application that uses the user culture to determine the type of conversion to convert one language to other language.
✓ Deploy Sample Asp.Net MVC application on IIS.