**Department of Computer and Information Sciences**

**COSC 495 – Independent Study**

Fall 2020

**Instructor**: Dr. Charles Dierbach **Email**: [cdierbach@towson.edu](mailto:cdierbach@towson.edu)

**Office**: 7800 York Road, Room 464 **Phone**: 410-704-3552

**Student**: Druv Narain **Email**: [dnarai1@students.towson.edu](mailto:dnarai1@students.towson.edu)

**Status**: Senior **Phone**: 443-640-5489

**Prerequisites**: Senior Standing

**Course Description:** Directed study in C# programming in the .NET platform. This course will cover Enterprise Application concepts and programming using Microsoft’s .NET Core framework as well as Web programming using ASP.NET Core.

**Course Objectives:** Upon completion of this course, the student will be able to:

1. Gain a better understanding of the structure of Enterprise-level applications
2. Learn how different software components and concepts are used build robust applications
3. Develop a dynamic web application utilizing a database using C# and .NET
4. Utilize various frameworks to build software solutions
5. Effectively use free online documentation for learning software development and programming

**Course Topics**

* Section 1: Overview of C#
  + Basics (loops, control-structures, methods, generics, collections, classes etc.)
  + Delegates, Anonymous Functions, Events
  + Connecting and Querying a Database with LINQ
* Section 2: Introduction to XML and JSON
  + Structure and Uses
  + Serialization/Deserialization
  + Handling XML and JSON with C#
* Section 3: Enterprise Applications: Concepts and Patterns
  + Layered Architecture: Presentation, Domain, Data, Infrastructure
  + RESTful Web Services
  + Dependency Injection Pattern
  + MVC/MVVM Pattern
  + Repository Pattern
* Section 4: Introduction to .NET Core
  + .NET Core Command Line Interface (CLI) and Building Projects
  + NuGet Packet Manager
  + Unit Testing with xUnit
  + Creating Dynamic Web Sites with ASP.NET
* Section 5: Working with Frameworks
  + Stylizing User Interfaces with Bootstrap
  + Creating Web Front End with Angular
  + Working on Databases with Entity Framework

**Assignments:**

* Section 1: Create simple C# programs demonstrating methods, generics, collections etc.
* Section 2: Create C# program utilizing JSON and XML with serialization/deserialization
* Section 3: Short essay describing Enterprise concepts and patterns
  + Create C# code snippets demonstrating them, if time available
* Section 4, 5: Project Report (See Course Project)

**Course Project**: The semester long project will be creating a full-stack web application (possible Social Media or E-Commerce type) using at minimum the following technologies/frameworks: C#, .NET Core (ASP.NET, Entity, LINQ), Angular, Bootstrap, HTML, IIS, SQLite

**Primary Resources:**

Microsoft Docs and Learning: <https://docs.microsoft.com/en-us/>

Dot Net Tutorials: <https://dotnettutorials.net/>

**Communication:** Upon approval of the course a Slack channel will be created and used for communication.

**Git/GitHub:** Course work will be stored in a Git or GitHub repository labeled   
cosc495-narain*-<section#>*”. Dr. Dierbach and Dr. Dehlinger will be added as Developers to track progress.