Course Description
Introduces students to database-driven Web application design and development, and Web presentation using server-side coding and advanced techniques. Additional topics include LINQ, AJAX, and RESTful Web services.

Prerequisites
The prerequisite for this course is IT 331 (or an approved equivalent course). A grade of "C" or better must be achieved in the prerequisite course before a student is qualified to take this course. The prerequisite course must be completed prior to, not on currently with, this course.

This requirement will be strictly enforced. Any student who does not meet the prerequisite requirement will be dropped from the course by the Instructor at the start of the semester and the student will be responsible for any consequences of being dropped.

Rationale
Rapid development of websites in today’s world is a must. Further, with the advent of Web 2.0, the focus has shifted from presentation to collaboration.

Sites such as YouTube and Facebook make their very existence based on collaboration between their users. The web is changing quickly and in such environment, it is important to learn how to develop and manage advanced content and sites quickly and efficiently.

In this course, the focus will be primarily on Microsoft’s ASP.NET technologies, a collection of frameworks, development tools, and programming languages designed to allow for fast and consistent development of advanced websites.
We will also look at web servers in general and delve a bit into client-side technologies such as AJAX.

**Objectives**

On successful completion of this course, students will:

- Understand a web server’s functionality
- Create web applications using ASP.NET MVC
- Create a web application that is responsive
- Use a CSS Framework such as Bootstrap.
- Validate user input on a web page
- Create a database and retrieve data using advanced techniques
- Use Entity Framework to access and query a relational database
- Understand Language Integrated Query (LINQ)
- Understand Performance and Security considerations when designing a web application.
- Use WebAPI to create a Representational State Transfer (REST) service
- Cross Platform Web Development using Microsoft Technologies

**Supported Student Outcomes at the Program Level**

- 2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
- 5) Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.
- 6) Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems.

**Textbook**

**ASP.NET MVC with Entity Framework and CSS**

Lee Naylor;


**Publisher's URL**

An electronic version of the textbook, provided by Safari® Tech Books Online, is accessible through the university library website free of charge.

Please note: Download the course exercise and example material from
System Requirements

- Workstation with Windows Server 2016 (recommended) or Windows 10 (Home, Professional, Education, or Enterprise). (Physical or Virtual)
- 1.8 GHz or faster processor. Dual-core or better recommended
- 2 GB of RAM; 4 GB of RAM recommended (2.5 GB minimum if running on a virtual machine)
- Hard disk space: up to 130 GB of available space, depending on features installed; typical installations require 20-50 GB of free space.
- Video card that supports a minimum display resolution of 720p (1280 by 720); Visual Studio will work best at a resolution of WXGA (1366 by 768) or higher.
- One USB disc drive (not using power) to copy class files. 16Gb is preferred.
- Visual Studio 2017 Community Edition

AWS Cloud Requirements

- All students will need to create an account on the Amazon Web Services Education website. Registration details will be provided during the first lecture.
  
  https://www.awseducate.com

- Throughout the course, students will be required to publish their assignments and projects to AWS for grading and demonstrations purposes.
- Students will also utilize a virtual development workstation using an AWS EC2 instance for development activities as well. Setup details will be provided during the first lecture.

Faculty

Name: Randy Michak

Email Address: rmichak@gmu.edu

Office Hours: By appointment
Teaching Assistant
TBD

Administrative Support

Fairfax Campus
Nguyen Engineering Building, Room 5400
Phone: 703-993-3565

Science and Technology Campus
Bull Run Hall, Suite 102
Phone: 703-993-8461

For a map and directions, visit: http://maps-directions.gmu.edu

Grading
Grades will be awarded in accordance with the Mason Grading System for undergraduate students.

See http://www.gmu.edu/catalog/apolicies/ under Grading System for more information.

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>97 - 100%</td>
<td>A+</td>
<td>Passing</td>
</tr>
<tr>
<td>93 - 96%</td>
<td>A</td>
<td>Passing</td>
</tr>
<tr>
<td>90 - 92%</td>
<td>A-</td>
<td>Passing</td>
</tr>
<tr>
<td>87 - 89%</td>
<td>B+</td>
<td>Passing</td>
</tr>
<tr>
<td>83 - 86%</td>
<td>B</td>
<td>Passing</td>
</tr>
<tr>
<td>80 - 82%</td>
<td>B-</td>
<td>Passing</td>
</tr>
<tr>
<td>77 - 79%</td>
<td>C+</td>
<td>Passing</td>
</tr>
<tr>
<td>73 - 76%</td>
<td>C</td>
<td>Passing</td>
</tr>
<tr>
<td>70 - 72%</td>
<td>C-</td>
<td>Passing*</td>
</tr>
<tr>
<td>60 - 69%</td>
<td>D</td>
<td>Passing*</td>
</tr>
<tr>
<td>0 - 59%</td>
<td>F</td>
<td>Failing</td>
</tr>
</tbody>
</table>
* Grades of "C-" and "D" are considered passing grades for undergraduate courses. However, a minimum grade of "C" is required in the BSIT program for any course that is a prerequisite for one or more other courses. This course is a prerequisite for several courses in BSIT Concentrations – see http://www.gmu.edu/catalog/courses/it.html for more information on those courses.

**Grading Weights**

<table>
<thead>
<tr>
<th>Participation/Discussion Boards</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Class Exercises &amp; Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Projects</td>
<td>50%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Students will individually design, build, publish, and submit individual projects in accordance with requirements to be discussed in class.

Late projects and exercises **will not be accepted** without prior approval from the instructor. If a late assignment is accepted, a late penalty will be applied.

Throughout the term students will be assigned in class exercises in order to practice concepts learned. Upon completion, students will be required to submit completed exercise to blackboard in order to receive credit.

Students will be required to stay engaged using the online discussion board. Each module will have an associated discussion board. Students will need to post questions or information weekly. Students are expected to check the discussion board frequently (at least 1-2 times per week), read the latest postings, and reply to classmates and instructor postings. A **minimum of one thread is required each week, along with 2 replies to fellow students.**

There will be a cumulative final exam held on the last day of the course. The exam will consist of multiple choice, true/false, and short answer questions related to concepts taught in this course.

A student with a "hold" on his/her PatriotWeb account will be unable to access final grades until the hold has been removed by the Registrar.
Homework
To complete projects additional research/lab work might be necessary. Homework may be assigned each week during the semester in the form of working on the chosen project. Additional lab work/time will be required to complete projects or class assignments.

Schedule
This is a tentative schedule of topics and is subject to change throughout the course. Students should refer to the Blackboard system for the latest schedule.

<table>
<thead>
<tr>
<th>Week</th>
<th>Content</th>
<th>Reading</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| 1    | • Course Introduction  
       • C# Primer  
       • Development Environment Setup (AWS) | | |
| 2    | • Web Foundations | CH 1 | |
| 3    | • Introduction to ASP.NET MVC | CH 2 | |
| 4    | • Data-Driven Views and Controllers | CH 4 | |
| 5    | • EF Database Strategies  
       • Data Validations | CH 4 | |
| 6    | • Security | CH 7 | Project I Assigned |
| 7    | • Searching, Filtering, Sorting & Paging | CH 3 & 5 | |
| 8    | • RWS & Bootstrap | CH 14 & 18 | |
| 9    | • Server-Side Validations  
       • Error Handling  
       • Cashing & Performance | | Project I Due |
<p>| 10   | • Entity Framework Code First - Existing Database | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11</strong></td>
<td>• Entity Framework Code First - Existing Database</td>
<td>CH 11</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>• WebAPI/RESTful Interfaces</td>
<td>Project II Due</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>• ASP.Net SignalR</td>
<td></td>
</tr>
<tr>
<td><strong>14</strong></td>
<td>• Special Topics</td>
<td></td>
</tr>
</tbody>
</table>
| **15** | • Course Wrap-Up  
• Final Review | Project III Due |

### Important Dates

Dates for adding, dropping the course, etc. are available via: [http://registrar.gmu.edu](http://registrar.gmu.edu).

### Religious Holidays

A list of religious holidays is available on the [University Life Calendar page](http://registrar.gmu.edu). Any student whose religious observance conflicts with a scheduled course activity must contact the instructor **at least 2 weeks in advance** of the conflict date in order to make alternative arrangements.

### Attendance Policy

Students are expected to be logged in to the course at a minimum twice a week and more importantly track the completion of one module per week for the duration of the course.

Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling, severe circumstances supported by appropriate documentation. Except in such circumstances, failure to arrive to the exam site on time for a scheduled exam will result in a score of zero (0) for that exam, in accordance with Mason policy on final exams. Students should not make travel plans or other discretionary arrangements that conflict with scheduled classes and/or exams. If the University is closed due to weather or other unforeseen conditions, final exams may be rescheduled – students are strongly advised not to make plans that would prevent them from attending exams that may be rescheduled during the entire exam period.

### Classroom Conduct

Whether the course is face-to-face or online, students are expected to conduct themselves in a manner that is conducive to learning, as directed by the instructor. Any student who negatively
impacts the opportunity for other students to learn will be warned – if disruptive behavior continues, the student will be removed from the course.

**Communications**

Registered students will be given access to a section of the Blackboard Learning System for this course. Blackboard will be used as the primary mechanism (outside of lectures) to disseminate course information, including announcements, lecture slides, assignments, and grades.

Communication with the instructor on issues relating to the individual student should be conducted using Blackboard Mail, GMU email, via telephone, or in person - not in the public forums on Blackboard. GMU Mail is the preferred method – for urgent messages, you should also attempt to contact the instructor via telephone. Federal privacy law and GMU policy require that any communication with a student related in any way to a student's status be conducted using secure GMU systems – if you use email to communicate with the instructor you **MUST** send messages from your GMU email account.

All course materials (lecture slides, assignment specifications, etc.) are published on Blackboard in Adobe® Portable Document Format (PDF) or in a format for which a free reader is available (such as Microsoft PowerPoint). This allows users of most computing platforms to view and print these files. Microsoft® Word (or a compatible word processing application) is required for preparing assignments – it is available on computers in the Mason open labs.

Communication with the instructor on issues relating to the individual student should be conducted using Blackboard Mail, GMU email, via telephone, or in person - not in the public forums on Blackboard. GMU Mail is the preferred method – for urgent messages, you should also attempt to contact the instructor via telephone. Federal privacy law and GMU policy require that any communication with a student related in any way to a student's status be conducted using secure GMU systems – if you use email to communicate with the instructor you **MUST** send messages from your GMU email account.

**Privacy**

Instructors respect and protect the privacy of information related to individual students. As described above, issues relating to an individual student will discussed via email, telephone or in person. Instructors will not discuss issues relating to an individual student with other students (or anyone without a need to know) without prior permission of the student.

Graded work other than exams will be returned to individual students directly by the instructor (or by a faculty or staff member or a teaching assistant designated by the instructor or via another secure method). Under no circumstances will a student’s graded work be returned to another student.

Faculty and staff will take care to protect the privacy of each student's scores and grades.

**Disability Accommodations**

The Office of Disability Services (ODS) works with disabled students to arrange for appropriate accommodations to ensure equal access to university services. Any student with a disability of any
kind is strongly encouraged to register with ODS as soon as possible and take advantage of the services offered.

Accommodations for disabled students must be made in advance – ODS cannot assist students retroactively, and at least one week's notice is required for special accommodations related to exams. Any student who needs accommodation should contact the instructor during the first week of the semester so the sufficient time is allowed to make arrangements.

Honor Code

All members of the Mason community are expected to uphold the principles of scholarly ethics. Similarly, graduating students are bound by the ethical requirements of the professional communities they join. The ethics requirements for some of the communities relevant to Applied IT graduates are available via the following links:

ACM Code of Ethics and Professional Conduct

IEEE Code of Ethics

EC-Council Code of Ethics

On admission to Mason, students agree to comply with the requirements of the GMU Honor System and Code. The Honor Code will be strictly enforced in this course. Honor Code cases are heard by a panel consisting of students – students who meet the requirements are encouraged to nominate themselves to serve on the Honor Committee. Any use of the words or ideas of another person(s), without explicit attribution that clearly identifies the material used and its source in an appropriate manner, is plagiarism and will not be tolerated. The instructor will use several manual and automated means to detect cheating and/or plagiarism in any work submitted by students for this course, and to direct teaching assistants and/or other faculty and/or staff members to do likewise in support of this course.

WARNING! This course has a zero tolerance policy for violations of the Honor Code. There are no second chances. First offenses carry a minimum recommended sanction of: an assignment grade of 0, one letter grade (10%) reduction in the final grade, and a requirement to complete an academic integrity seminar. Second and third offenses (and egregious first offenses, as determined solely by the instructor/course coordinator) carry stiffer minimum recommended sanctions, including but not limited to: F in the course, academic suspension, and expulsion. Please do not even think about violating the Honor Code. There are many ways to receive help. You are strongly encouraged to use these methods if you are struggling, so that you can get the help you need. If you have any questions about what does/does not constitute an Honor Code violation, please contact your instructor.

Additional information on the enforcement of the George Mason University Honor Code policy can be found at: http://oai.gmu.edu.