Carnegie Mellon
Heinz College

Course Information*	Course Title: **95-482/95-882 Enterprise Web Development** Instructor: Dr. Michael Bigrigg (bigrigg@andrew.cmu.edu)
Prerequisites (if applicable)	A Previous Programming Course. This course assumes some previous programming exposure (variables, arrays, loops, and decision structure). Students without much programming experience should take 95-881/95-481, Web Application Development, which does not assume as much programming experience, and is much more structured to support students with less programming exposure. The course content will be different, meaning that 95-481/95-881 is not a subset of 95-482/95-882.
Description*	Enterprise web applications are a complex relationship between the client, server, and any additional back-end services. Web systems are becoming more supportive of users such that the system must adapt based on the needs and behaviors of the users. This course will support the understanding of the data that drives the enterprise web development, which includes the analysis of web traffic and usage, ads, and the personalization of the web experience. This course focuses on the development of an enterprise web application with specific emphasis on the server-side enterprise web application programming and an n-tier system approach. The students will design and develop a full enterprise web application including an n-tier implementation over the lifetime of the course. The development aspect will include server programming languages and systems (such as PHP, Django, Node) and database support (such as mySQL) as well as appropriate front-end development. Heinz web courses are a mix of business, technology and analytics, and not simply about programming.
Learning/Course Objectives*	1. Understand the development of a server-side n-tier enterprise web system including its capabilities and limitations, along with the analysis of the web traffic and usage patterns. 2. Develop skills in server-side web application development technologies. 3. Design an enterprise web product based on data analytics approaches to provide an enriched content based system. 4. Apply features to create a functioning enterprise web application.
Course Materials (if applicable)	Pratical Web Analytics for User Experience, Michael Beasley UXPin Web UI Design Patterns **2014** *Internet resources, as announced.*
Grading Scale*	A+ 100% B+ 87 - 89% C+ 77 - 79% A 93 - 99% B 83 - 86% C 73 - 76% A- 90 - 92% B- 80 - 82% C- 70 - 72% This is the **minimal** requirement needed to achieve each grade.

Evaluation Method	50% Concepts (Quizzes and/or Exams) 50% Programming Homework (30% Implementation; 20% Reflection Questions)
Key Topics	Enterprise (N-Tier) Web Design and Development Enterprise Web Technologies, Networking, and Systems Web Productx Patterns: Gamification, Natural Language Input, Recommendations Data Analytics
Prerequisite Knowledge	It is assumed that the students have had previous programming experience in a traditional programming environment not necessarily web programming.
Course Relevance	The web browser has become a major platform for application development, and its development is fundamentally different from traditional general purpose programming. This course focuses on the fundamentals of web development using the browser as a platform with a focus on the full enterprise web application using data analytics for user enriched content.
Course Goals	The development aspect will include all aspects of web development. This is not simply a programming course. A major emphasis is on the use of web programming patterns with data analytics to enhance the experience with established features. The programming will include how to implement these features that are designed specifically for the enterprise web, namely to enhance the user content through analytics. The students will design and develop an enterprise web application over the lifetime of the course.
Assessment Structure	There will be one course project, which includes a programming component as well as an examination component. The examination component of the project will be for the demonstration of understanding of the concepts developed during the production of the project. There will be quizzes, designed to reinforce material that was presented as there are concepts that are presented in the class that are not tied to the production of the course programming project artifact, with the weight of an exam.
Learning Resources	The books are used as reference material as needed. There is no assigned reading from the books. The internet is full of useful reference material related to this class, including w3schools, which we will use.
Extra Time Commitments	There are no additional requirements for this class beyond what would be needed to complete assignments.
Course/Topical Outline	**Programming Topics**: PHP-Django-Node, SQL, JavaScript, and HTML/CSS **Analytics**: Machine Learning, Indicators, User Clustering, and Activity Tracking **Features**: Gameification, Natural Language Input, Recommendations

Detailed Course/Topical Outline:	**Web Technology** We will focus on what is the big picture of web technology to understand the different types of web systems that have been developed including static websites, content-based systems, Web 2.0, search engines, and e-Commerce. This will be the foundation that provides further understanding of how to program each segment of a full web system, including the front-end and back-end. There will be some mention of the contrast between traditional programming (if-then-else, looping, functions) with web approaches which focus more on the event-driven document manipulation of the front-end web programming and the client-server n-tier form processing of the back-end web programming. We will overview the course project you will develop. There will be elective lectures on specific web programming techniques: front-end forms and HTML, back-end extraction and database integration, back-end formatting of content, and front-end user experience improvement. **Web Application Features:** Beyond just the underlying web programming technology, we will explore several advanced web programming patterns focused on creating a well-rounded web application. Unlike basic web programming classes that discuss the technology first and then give some examples of when it might be used, we will focus on what we need to build and why we include it, then with the how. We will overview several web programming patterns such as: Simple Input: Empty States, Expandable Inputs, Action Context Tags: Flagging/Reporting, Vote to Promote, Like, Favorites & Bookmarks, Tagging Alert: Stats/Dashboard, Activity Feeds, Notifications Friends: Friends List, Group Friends & Content, Direct Messaging Tracking: History, Next Step, Related Content, Recommendations Advanced Input: Natural Language Inputs **Web Analytics:** We wil review Web and Internet networking. We wil dissect web server software to understand how it works. The material will form the basis for our understanding of web analytics. We will review different analytic approach for web systems. We will overview the analysis of web logs and what the different metrics mean and why they are important. While there are tools that can be used to automate the process of analysis, we will discuss the limitations of the tools based on a lack of industry standard as to calculate the metrics, using programming examples and data.

Course Policies & Expectations	**Students with Disabilities:** Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. CMU and your instructors are committed to your success and to supporting Section 504 of the Rehabilitation Act of 1973 as amended and the Americans with Disabilities Act (1990). This means that in general no individual who is otherwise qualified shall be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity, solely by reason of having a disability. If you believe that you need accommodations for a disability, please contact us ASAP, and we will work together to ensure that you have the correct access to resources on campus to assist you through your coursework and time at CMU. **Academic Integrity:** Carnegie Mellon University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript notation "Violation of the Academic Integrity Policy." The standard sanction for a first offense by graduate students is suspension or expulsion. Please see http://www.cmu.edu/academic-integrity/ for any questions. **Cell Phones, Smartphones and other handheld wireless devices:** Other than during class breaks, please silence ring tones and refrain from engaging in calls, messaging or other use during class time. All devices must not be visible in any way during quizzes. **Policy Regarding Students Using English as a Foreign Language:** Assignments in this course are graded with reference to evidence of the acquisition of concepts, presentation format, and accuracy of information. Having done business in countries that use languages other than English, we understand that the use of an unfamiliar language can result in unusual word choices or grammatical errors that are not critical to the overall understanding of the information. Therefore, we will take into account your need to function in a language that may be unfamiliar to you. We will provide feedback as appropriate if we feel that language or grammar you have used in assignments would be best if it were configured in a different way. **Use of Canvas System for this course:** The Heinz School uses Carnegie Mellon University's Canvas system to facilitate distance learning as well as to enhance main campus courses. In this course, we will use the Canvas system generally to post lecture notes and related documents and to receive assignments electronically from students. **Take care of yourself.** Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website athttp://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help. We welcome feedback during and after the course. Students are encouraged to share life-experiences in class. We are open to suggestions about class sequences, changes to the content and additional topics to cover.