

SWE 642

Software Engineering for the World Wide Web

Spring Semester, 2022

Location: **Online/Blackboard Collaborate Ultra**

Time: Tuesday 7:20-10:00pm

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Professor: **Dr. Vinod Dubey**
Email: vdubey@gmu.edu
Class Hours: Tuesday 7:20-10:00
Prerequisite: SWE 619 and SWE Foundation material or (CS 540 and 571)
Office Hours: Anytime electronically, or by an appointment
GTA: **TBD, Email: tbd@gmu.edu**
GTA Office Hours/Location: TBD – Please check GTA office hours site
<https://cs.gmu.edu/academics/gta-office-hours/>

Overview

OBJECTIVE:

After completing the course, students will understand the concepts and have the knowledge of how web applications are designed and constructed. Students will be able to engineer high quality building blocks for Web applications.

CONTENT:

Detailed study of the engineering methods and technologies for building highly interactive web sites for e-commerce and other web-based applications. Engineering principles for building web sites that exhibit high reliability, usability, availability, scalability and maintainability are presented. Methods such as client-server programming, component-based software development, middleware, and reusable components are covered. After the course, students should be prepared to create software for large-scale web sites.

SWE 642 teaches some of the topics related to the exciting software development models that are used to support web and e-commerce applications. We will be studying the software design and development side of web applications, rather than the policy, business, or networking sides. An introductory level knowledge of HTML and Java is required. SWE 619 is a required prerequisite and SWE 632 is a good background course. The class will be very practical (how to build things) and require several programming assignments.

The course content will focus on client-side and server-side software design and development. We will learn technologies such as **XHTML/HTML5, CSS3, JavaScript, Ajax, jQuery, Angular-Web Development Framework, TypeScript, Web components of JEE platform: Servlets and JSPs, Integration of Servlets and JSPs: An implementation of Model View Controller (MVC) Architecture, JDBC, Java Persistence API (JPA 2.0), Enterprise JavaBeans (EJB3), Messaging, Message Driven Beans, RESTful Web services, and the Docker container technology to containerize Web Applications. The course content includes the Full Stack Web Development with Angular and Spring Boot.**

Textbook and Readings

- *Internet & World Wide Web How to Program (5th Edition)* , P.J. Deitel and H.M. Deitel, Pearson Prentice Hall (**Recommended**)
- **Java: How to Program**, Deitel and Deitel , Prentice Hall. (**Recommended**)
- **Core Servlets and JavaServer Pages**, Core Technologies by Marty Hall and Larry Brown (**Recommended**)
- **Spring Boot: Up and Running: Building Cloud Native Java and Kotlin Applications** 1st Edition by Mark Heckler (**Recommended**)
- **Beginning EJB in Java EE 8: Building Applications with Enterprise JavaBeans** 3rd ed. Edition by Jonathan Wetherbee, Massimo Nardone, Chirag Rathod, Raghu Kodali (**Recommended**)

Grading

EXAMS:

There will be a midterm and a final exam, both in class. The final exam will focus on material covered after the midterm.

Phone Use Policy: Phones should be switched off during the mid-term and final exams. Phones, especially smart phones with Internet access and camera, are not allowed to be on person during exams.

HOMEWORK/PROGRAMMING ASSIGNMENTS:

Several homework assignments will be given. I will post the assignments on the class web site or on Blackboard and discuss them in class. You will submit your solutions by placing links to the executables on your class web sites and submitting the source files through [blackboard](#). Be sure that you are on the class mailing list, as refinements and hints for the assignments will be sent through email as well as posted on blackboard. Assignments will be checked immediately after the due date; if you finish an assignment late, you must inform us by email when it is ready for us to grade it. Changing an assignment after the due date without prior permission will be treated as a late submission. Programs will be graded on style and formatting as well as correctness.

MAKEUPS:

Unless arrangements are worked out in advance, missed tests **cannot** be made up, and 10 percent per class meeting will be deducted for late homework submissions. Under no circumstances will any assignment be accepted after the official end of classes (the start of finals week).

GRADING:

Grades will be: 33% the midterm, 34% the final, 33% the programming assignments.

Final averages are assigned a letter grade according to the following ranges:

Percentage	Grade
[99, 100]	A+
[92, 98]	A
[90, 91]	A-
[88, 89]	B+
[82, 87]	B
[80, 81]	B-
[78, 79]	C+
[72, 77]	C
[70, 71]	C-
[60, 69]	D
[0, 59]	F

Schedule (subject to change; check regularly)

Week	Date	Lecture topic	Readings	Announcements
1	1/25	Course Overview Introduction to the Internet and World Wide Web	<ul style="list-style-type: none"> DD1, paper 	
2	2/01	Intro to Web Software XHTML/HTML5	<ul style="list-style-type: none"> DD 2 and 3 https://www.w3schools.com 	HW1
3	2/08	Presentation & Styles Cascading Style Sheets (CSS3), JavaScript	<ul style="list-style-type: none"> DD 4, 5 https://www.w3schools.com 	
4	2/15	Client-side Software JavaScript, JavaScript Functions, DOM, Event Handling	<ul style="list-style-type: none"> DD 6-13, 16 https://www.w3schools.com 	HW2
5	2/22	Client-side Software More on JavaScript; Cookies, Ajax	<ul style="list-style-type: none"> Class Notes; http://jquery.com/ 	
6	3/01	Rich Internet Applications jQuery Essential, jQuery User Interface (jQuery UI) Bootstrap 4	<ul style="list-style-type: none"> Class notes, http://jquery.com/ http://jqueryui.com/ https://getbootstrap.com/ 	
7	3/08	Server-side Software Java Servlets, Java Server Pages (JSP), State Handling in Web Applications;	Class notes, & Ch 6, 7, 8	HW3

		Integration of Servlets and JSPs Implementing Model View Controller (MVC) Architecture; Midterm Exam Review		
8	3/15	Spring Break	No Class	
9	3/22	Midterm Exam (7:20 pm - 10:00 pm)	In the classroom/Online	
10	3/29	Spring Boot - Intro Data Persistence Java JDBC Java Persistence API (JPA 2.0); Spring Data JPA	<ul style="list-style-type: none"> • Appendix C, JHTP 28 	
11	4/05	Service Tier Web Services—RESTful Spring Boot RESTful API; Integrating Spring Boot RESTful API with JPA and Hibernate	<ul style="list-style-type: none"> • Class notes, http://www.w3schools.com • JHTP Chapter 31 	
12	4/12	Single-Page Application (SPA) Angular JavaScript Framework, TypeScript; Integrating Angular Frontend to Spring Boot RESTful Web Services	<ul style="list-style-type: none"> • Class notes, https://angular.io/docs 	HW4
13	4/19	Business Tier Enterprise JavaBeans (EJB3) Session Beans	<ul style="list-style-type: none"> • Chapters 5, 6, 7, 8 of EJB3 book 	

		(Stateless, Stateful, Singleton);		
14	4/26	Business Tier Messaging and Message Driven Beans	<ul style="list-style-type: none"> Chapters 5, 6, 7, 8 of EJB3 book 	
15	5/03	Containerizing Web Applications Docker Containers Project Presentation/Demo (Optional) Final Exam Review	https://www.docker.com/	
16	5/10	Reading Day		
17	5/17	Final exam (7:20 pm - 10:00 pm)	In the classroom/Online	

Note: DD refers to chapters in Deitel & Deitel's Internet and WWW book, and JHTP refers to chapters in Java How to Program book

Academic Integrity

George Mason's [policy](#) concerning student conduct applies. Although students are encouraged to discuss the topics covered in class, all homework assignments, exams, and projects are to be completed individually, unless joint work is explicitly authorized by the instructor. If joint work is authorized, all contributing students must be listed on the submission. Any deviation from this is considered an Honor Code violation, and, as a minimum, will result in failure of the submission and, as a maximum, failure of the class.

Please note that there are two honor code policies: an abstract GMU policy and a more specific departmental policy with regard to code plagiarism, test-taking, etc. The students can find them here: [Honor Code Policies](#)

Disabilities

If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 993-2474. All academic accommodations must be arranged through the DRC.