



CSYE 6220 Enterprise Software Design

Course Information

Course Title: Web Development Tools and Methods
Course Number: INFO 6250
Term and Year: Fall 2025
Credit Hour: 4
Course Format: On-Ground

Instructor Information

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Course Prerequisites

Must be enrolled in MS Software Engineering Systems or MSCSE Computer Systems Engineering

Course Description

Explores advanced server-side technologies and tools necessary to design and engineer complete web-based enterprise applications quickly. Designed to build on previous experience in the Application Engineering and Development course to cover the life-cycle of a web based application. The main focus of this class is Spring MVC and Hibernate to build server-side, database intensive, and multi-tier web applications. Additionally, Spring AI, designing Rich Internet Applications (RIA) using AJAX, and Service-Oriented Architecture (SOA) using REST will also be discussed. Even though the choice of RDBMS is MySQL in this class, connecting to Oracle and MSSQL Server will also be discussed.

Standard Learning Outcomes

Learning outcomes common to all College of Engineering Graduate programs:

- 1. An ability to identify, formulate, and solve complex engineering problems.*
- 2. An ability to explain and apply engineering design principles, as appropriate to the program's educational objectives.*
- 3. An ability to produce solutions that meet specified end-user needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*

The Information Systems Program accepts students of different engineering backgrounds with minimum programming skills and produces first class Information Systems engineers that operate at the intersection of real-world complexity, software development, and IT management. Graduating students will be able to construct end-to-end advanced software applications that meet business needs.

Specific Learning Outcomes for the Information Systems program:

- 1. Create a strong technical foundation through diverse, high-level courses*

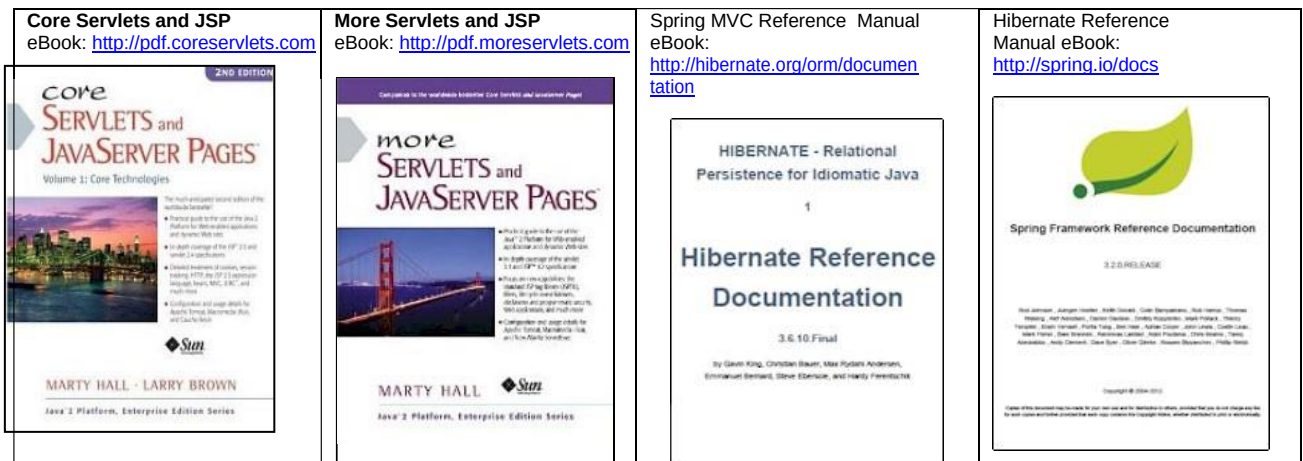
2. Built crucial interpersonal skills needed to succeed in any industry
3. Foster a deep level of applied learning through project based case studies

Objectives:

- Design and build web applications using Spring MVC and Hibernate
- Learn JSTL and other Custom Tag Libraries and design web pages
- Learn how to process web client requests Asynchronously using AJAX and DWR
- Learn Velocity, and FreeMarker to generate dynamic HTML Web pages, particularly by Spring MVC applications following the MVC pattern.

References

No textbook is selected for this class due to a number of different subjects covered, but there are several free eBooks that will be used as reference materials in addition to lecture slides.



Grades:

- Assignments: 10%
- Lab Quizzes: 10%-20%
- Midterm: 20-30%
- Final Project: 20-30%
- Final Exam: 20-30%

Tentative Course Outline

Lecture 1.1 – Client-Side vs. Server-Side

Internet Philosophy and approach

Internet Protocols IP/TCP/UDP and comparisons

Domain names and DNS Services

HTTP protocol and HTTPS

Web Servers Vs. Application Servers

Client/Server Model vs Peer model of computing

Lecture 1.2 – Introduction to Servlets

The Advantages of Servlets Over “Traditional” CGI

Basic servlet structure, and generating pages dynamically

Requests and Responses

Handling the Client Request: Form Data

☞Self Study: JavaScript, JSON, and AJAX

Lecture 2.1 – Overview of JSP Technology

The need for JSP

Benefits of JSP

Basic JSP Syntax

☞Self Study: DWR & JQuery

Lecture 2.2 – Session Management

Session management is a mechanism to maintain state about a series of requests from the same user across some period of time. That is, the term "session" refers to the time that a user is at a particular web site. The problem is that HTTP has no mechanism to maintain state. Individual requests aren't related to each other. The Web server can't easily distinguish between single users and doesn't know about user sessions. Session management refers to the way that associate data with a user during a visit to a Web page.

☞Self Study: Expression Language

Lecture 3 – Integrating Servlets and JSP: The Model View Controller (MVC) Architecture

Understanding the benefits of MVC

Using RequestDispatcher to implement MVC

Forwarding requests from servlets to JSP pages

Forwarding requests from JSP pages

Including pages instead of forwarding to them

☞Self Study: JSTL

☞Self Study: Custom Tags

Lecture 4 – Introduction to Spring MVC

Getting started with Spring MVC

Mapping Requests to Controllers

Handling Requests with Controllers

Lecture 5 – Rendering Web views

Resolving views

Using JSP Templates

Working with JSP alternatives

Generating non-HTML output, Producing Excel spreadsheets, Generating PDF documents

☞Self Study: Tiles

Lecture 6 – Spring Form Controllers and Validators

☞Self Study: Velocity

☞Self Study: FreeMarker

Lecture 7 – Persisting Objects with Hibernate Lecture 8 – Mapping persistent classes

Lecture 8 – Mapping persistent

Lecture 9 – Mapping collections and entity associations

Self Study: Java Annotations and Annotation-Based Mapping

Lecture 10 – Conversational Object Processing

Working with Objects

Transactions

Optimizing fetching and Caching

Advanced Query Options

Lecture 11 – Core J2EE Patterns – DAO (Data Access Object Lecture 12 – Spring WebFlow

Self Study: REST

Lecture 13, 14 – Advanced Spring MVC Concepts or other MVC Frameworks

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is very important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at

<https://neu.evaluationkit.com>. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your HuskyMail account notifying you when surveys are available.

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accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <http://www.northeastern.edu/drc/getting-started-with-the-drc/>.

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The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for Education specific resources, visit <http://subjectguides.lib.neu.edu/edresearch>.

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Within Blackboard, open a support case via the red support button on the right side of the screen, click Create Case

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Visit the [Information Technology Services \(ITS\) Support Portal](#)

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ITS Customer Service Desk: 617-373-4357

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