Northeastern University
College of Engineering

CSYE 6220 Enterprise Software Design

Course Information
Course Title: User Experience Design and Testing
Course Number: CSYE 6220
Term and Year: Spring 2024
Credit Hour: 4
Course Format: On-Ground

Instructor Information
Full Name: Yusuf Ozbek
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Course Prerequisites
Graduate Level CSYE 6200 Minimum Grade of B- or Graduate Level CSYE 6202 Minimum Grade of B- or Graduate Level CSYE 6205 Minimum Grade of B-

Course Description
Designed to build on previous experience in concepts of object-oriented design courses with equal focus in the three areas of architecture, design, and implementation. Instruction and hands-on exercises cover both server-side and client-side web programming. Offers students an opportunity to build a conceptual understanding and to gain practical experience with popular frameworks (Spring MVC, Hibernate, and Dojo or jQuery) that increase productivity, empower developers, and greatly simplify web development. The goal is to be able to build the server side and client side of substantial web-based, client-server, database-intensive, multitier applications.

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*

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, 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.

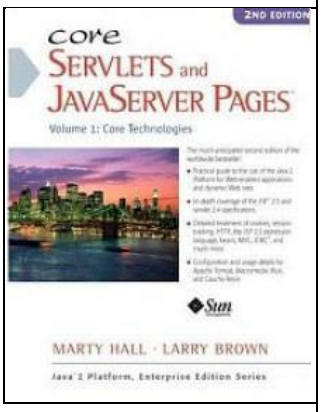
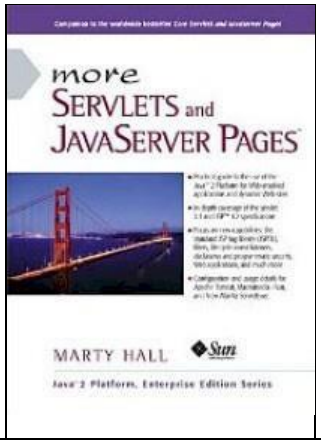
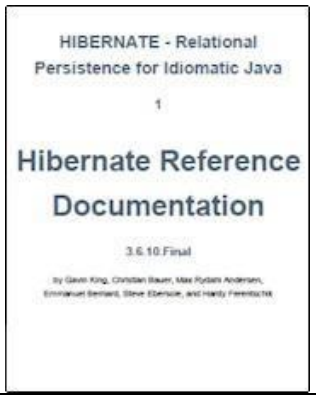
Prerequisites: Graduate level CSYE 6200 Minimum Grade of B- or Graduate level CSYE 6202 Minimum Grade of B- or Graduate level CSYE 6205 Minimum Grade of B-

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.

Core Servlets and JSP eBook: http://pdf.coreservlets.com	**More Servlets and JSP** eBook: http://pdf.moreservlets.com	Spring MVC Reference Manual eBook: http://hibernate.org/orm/documentation	Hibernate Reference Manual eBook: http://spring.io/docs
			

Tentative Grading Policy:

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

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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 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.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive 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/.

Library Services

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.

24/7 Blackboard Technical Help

For immediate technical support for Blackboard, call 617-373-4357 or emailhelp@northeastern.edu

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

myNortheastern, e-mail, and basic technical support
Visit the Information Technology Services (ITS) Support Portal
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

TITLE IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

In case of an emergency, please call 911.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.