
CO3098 Web Technologies

Credits: 20 **Convenor:** Dr. Y Hong **Semester:** 1st

Prerequisites: *Essential: CO1003, CO1005, CO1019, CO2006*

Assessment: *Coursework: 50%*

Two hour exam in January: 50%

Lectures: 14 hours

Surgeries: 16 hours

Laboratories: 19 hours

Class Tests: 1 hours

Private Study: 100 hours

Subject Knowledge

Aims The aim of this course is to teach the students the technologies and techniques for creating large-scale systems on the WWW. We consider these large scale distributed systems in the context of how they emerged before concentrating on the following specific aspects: XML, JSON, Java Servlet, AJAX, Web MVC Frameworks and Web Services.

Learning Outcomes At the end of the course the student should be able to: Understand the architectural foundations for Web Technologies, understand XML/JSON and AJAX based techniques and use Java Servlet and JavaScript technology appropriately to create web applications and handle data, be aware of security and session handling issues, decrease server load and increase user-perceived performance of the web application, deploy and use Web service to bring together a variety of web data from multiple sources and combine them to create an integrated experience.

Methods Class sessions, flipped classroom, tutorials and practical sessions together with course notes, recommended reading, worksheets, and some additional hand-outs.

Assessment Assessed coursework, traditional written examination.

Skills

Aims To teach students the knowledges and skills for developing web applications.

Learning Outcomes Students will be able to: solve abstract and concrete problems (both routine seen, and simple unseen).

Methods Class sessions together with worksheets.

Explanation of Prerequisites No specific knowledge is required, but an understanding of, Markup Language (HTML), Database (SQL) and Programming in Object Oriented Paradigms (Java) and Scripting Language (JavaScript) as well as general program design skills will be helpful.

Course Description Software engineering in the time the Internet and e-commerce provides challenges that go beyond what is taught in traditional software engineering courses. In particular we are dealing with a large, distributed system that is not under particular control by anyone. This course discusses the issues that are relevant for designing useful, stable and secure systems in this context highlighting many of the currently prevailing technologies.

The course takes students from a background of 'traditional' middleware to the emerging paradigm of Service Oriented Computing. We introduce scalable techniques for developing applications for the web (e.g. Java Servlets, Java Script) – by both discussing their respective merits as well as getting hands-on experience in writing applications using these techniques.

One important aspect of web applications, that also occurs in enterprise application integration, is to deal with different data formats, and the de-facto standard these days are XML, JSON and their related technologies. XML Schema/ XSLT, server-side and client-side scripting languages (Java and JavaScript), AJAX, and Web Design (HTML5). The course will also look at Web Services and discussing how they can be combined with other

technologies for creating web applications.

Detailed Syllabus

Background: The emergence of web technologies in the context of distributed computing, supporting architectures, static and dynamic content provisioning techniques and standards, overview of web frameworks

Current Web data standards: XML and JSON related technologies, such as XML Schema/XSLT, XML and JSON parsing, as well as programming supports for them

Java servlets: designing and deploying Java Servlets and Java Server Page (JSP), session handling with cookies, sessions with servlet session APIs

Client-server communication AJAX, developing single-page web application using JQuery and Bootstrap.

Web services: Building, consuming and deploying SOAP/RESTful Web Services, Data Mashup

Web frameworks: Web MVC Frameworks, AngularJS and Spring MVC

Reading List

[C] Moller and Schwartzbach, *An Introduction to XML and Web Technologies*; ISBN: 0-321-26966-7, Addison Wesley, 2006.

[C] Hunter and Crawford, *Java Servlet Programming (2nd ed)*; ISBN: 0596000405, O'Reilly, 2001.

[C] Deitel, Deitel and Nieto, *Internet and World Wide Web: How to Program (2nd edition)*; ISBN: 0131218557, Prentice Hall, 2002.

[C] Jon Duckett, *JavaScript & JQuery: Interactive Front-end Web Development*, ISBN: 1118531647.

[C] Budi Kurniawan and Paul Deck, *Servlet, JSP and Spring MVC: A Tutorial*, ISBN: 1771970022.

Resources Study guide, worksheets, lecture rooms with data projector, computer laboratory access, tutorial rooms with OHP.

Module Evaluation Course questionnaires, course review.