Tentative Course Plan

CSI 5510 Advanced Web Design and Application

Winter 2018

Instructor : Khalid Mahmood Malik	**Class Schedule**: MW. 5:30 pm - 7:17 pm
Contact Email: mahmood@oakland.edu	Class Venue: Engineering Center 566 Office: EC 532 Tel:(248) 370-3542
Office Hours: Wednesday 10:00AM ~11:00AM or by appointment	

Course Description:

This course equally emphasizes the development and research aspects of web 2.0 and web 3.0. We not only pragmatically explore the many technologies that form the current web termed as web 2.0 (XML, DTD, XML Schema, XSLT, XQuery, Servlets, JSP, AJAX but also web of future call web 3.0 particularly Semantic Web. To understand the web 3.0, we will discuss the basics of knowledge representations technologies such as, Resource Description Framework (RDF), RDF Schema (RDFS), the Web Ontology Language (OWL) and Semantic Web Rule Language (SWRL). Additionally, we will discuss Semantic Web programming frameworks such as Jena, and graph query language such as SPARQL and other useful Semantic web tools. We explore these technologies, not as ends in themselves but rather for their role and merits in solving real problems. It will focus on the practicality: what you need to know to do real work, applications: what are the tools and technologies essential to put various technologies to use and potential: what are some of the most frequent ways different technologies of web 2.0 and 3.0 is being used in industry.
To give an idea to students about web applications vulnerabilities, this class will also briefly discuss the cause of web application vulnerabilities and best practices to tighten the security of web applications. This class will give emphasis to understanding from the bottom up.

Course Objectives

We will cover various topics to fulfill these objectives:

To understand the objectives of web 1.0, web 2.0 and web 3.0.
To understand the significance and purpose of XML technologies.
To understand how to structure data using XML, and to perform XML parsing.
To understand concepts of Service Oriented Architecture (SOA) and its implementation using Web Services.
To understand the concepts and design issues of MVC architecture, Multi-threaded servers and Session Management and be able to implement them.
To understand Graph Data Model for Semantic Web development and its comparison with XML and relational data modeling.
To understand the vision and concepts of Semantic Web.
To build simple ontology using Semantic Web technologies.
To understand querying mechanism in semantic web.

Course grade Criteria:

- Programming Assignments 30% (4 assignments, not equal weighted).
- A hybrid research + implementation based Project (50%)

- Short Research Paper with main emphasis on web 3.0 15% (10 % Write-up, 5% novelty)
- Implementation component with main emphasis on web 2.0- 25% (including 10% demo).
- Presentation 5%,

- Final Exam: 20%
- Extra credit assignments: 0-10%

NOTE: Peer evaluations will be conducted and the results will HEAVILY influence individual student's project grade.

[Example: (PeerEval %) * (Project Grade) = Individual Grade]

Teaching Philosophy

- Each topic covered in class will be aligned to at least one specific course objectives.
- There will be emphasis on strong foundational concepts and practical applicability of current and future web through lectures and readings. This course aims to inculcate through understanding of the foundational concepts of web 2.0 and futuristic trends (web 3.0) to prepare students for the emerging areas of semantic web, big data, and Web of Things. To achieve this important goal students will be equipped with the required skills including strong competence in: a) transforming crude ideas of term project to somewhat innovative ideas using brainstorming in teams b) designing term projects that mimic the real world or c) designing efficient algorithms, d) hands-on experience of using higher level languages in building small modules using proposed algorithms, and e) finally to build large scale projects by integrating distributed autonomous smart components on web, mobile devices and desktop platforms.
- Cooperative learning and diversity: Employers are always looking for team players who can work in diverse groups. In order to address and to promote idea of cooperative learning, this course will offer term projects and students will be encouraged to work in diverse team. The teams are required to collaborate to complete term project using Scrum methodology where Instructor play the role of product owner. Students are also encouraged to work in teams on homework assignments.
- Offering flexible learning (varying learning styles): To facilitate students who mostly have diverse background and learning styles, CSI 5510 is designed by mixing different teaching approaches: lectures, panel discussion, individual and collaborative activities, as well as research and implementation based projects. Rather than giving the same projects to all students, the instructor will help to define term projects ideas with respect to students having different majors and encourage them to do projects that are of their interest and align to their future professional goals.
- Active Learning: To offer active learning following methods will be adopted: a) while lecturing, questions will be raised and extra credit points will be given w.r.t difficulty of question b) To stimulate the thinking process short group activity during lectures will be offered. c) The concepts of group panel discussion is to reinforce the fundamental knowledge of web 2.0

Methodology

- Lectures, which introduce the full range concepts of Web 2.0 and Web 3.0.
- Presentation and discussion of up-to-date research papers, in which a

student leads the discussion on one of the approved topic

- A mini-conference, shaped as a regular computer-science conference, and panel discussion in which students present the results of their projects and papers.
- Team based collaborative project using Scrum methodology.

Textbook

No required textbook for this course. Lecture slides and reading assignments (research paper, e- books and other assorted material) will be posted on Moodle.

Reference Books

1. Online Tutorials and research papers. See Moodle web page.
2. *Tom Heath, Christian Bizer: " Linked Data - Evolving the Web into a Global Data Space", Morgan & Claypool, 2011.*
3. *Murach's Java Servlets and JSP (2nd Edition) by Joel Murach and Andrea Steelman ISBN-13: 978-1-890774-44-8.*
4. *A Semantic Web Primer*, (Third Edition), Grigoris Antoniou, Paul Groth, Frank van van Harmelen, Rinke Hoekstra ISBN: 0262018284
5. *Semantic Web for the Working Ontologist (2nd ed.)*, Dean Allemang and Jim Hendler, Morgan Kaufmann (2011), ISBN: 0123859654
6. *Programming the Semantic Web*, Toby Segaran, Jamie Taylor, and Colin Evans, O'Reilly, (2009), ISBN: 9780596802066
7. *Semantic Web Programming*, John Hebeler, Matthew Fisher, Ryan Blace, Andrew Perez-Lopez, Mike Dean, Wiley, (2009), ISBN: 9780470418017
8. "Web Services Platform Architecture", S. Weerawarana, F. Curbera, F. Leymanm, T. Storey and D. F. Ferguson, Pearson Education, 2005, ISBN 0-13-148874-0
9. "SOA in Practice", Nicolai Josuttis , O'Reilly Media, ISBN: 978-0596529550, August 2007

Grading Criteria

Digit number grades will be assigned according to the following policy: 91 – 100 ---- A = 3.6~4.0
89 -- 90 ---- A- = 3.5
87 -- 88---- B+ = 3.4
83 -- 86 ---- B = 3.2 ~3.3
80 -- 82 ---- B- = 3.0 ~3.1
77 -- 79 ---- C+ = 2.7 ~2.9
73 -- 76 ---- C = 2.3 ~2.6
70 -- 72 ---- C- = 2.0 ~2.2
67 -- 69 ---- D+ = 1.7 ~1.9
63 -- 66 ---- D = 1.2 ~1.6
60 -- 62 ---- D- = 1.0 ~1.1
0 -- 59 ---- F = 0

Course and class regulations

Deadlines are final and must be met. It is your responsibility to allocate time accordingly. All assignments must be turned in before 23:59 (EST) on due dates listed.

NO excuses will be accepted, including natural disasters and/or computer crashes. Ensure that you have enough backups to allow for the worst case scenarios, such as loss of your homework or project. I expect a professional attitude in order to ensure project success. No make-up exams will be given unless (1) I am notified 2 weeks prior to the official exam's administration that you will miss the exam, and (2) an acceptable University-approved excuse is provided promptly. Plagiarism of any type will result in an automatic report to the University Official.

Class attendance is mandatory. Except in extraordinary circumstances, **final grade will be seriously affected if a student misses more than three (3) classes.** Being late is being rude. Every student must attend class and participate actively. Active participation involves making contributions to the community of learning for the course. Students can contribute by throwing out thoughts, asking and answering questions related to the topics of the course.
Peer evaluation will be done for all group assignments, term paper and class project.
Please adhere to professional behavior in class. Refrain from side conversations, surfing the internet on personal devices, answering phones/ texting, etc.

Accommodation of Students with Disabilities

Students with disabilities who may require reasonable accommodations should contact Oakland University's Disability Support Services office for assistance. DSS office is located at 121 NFH, and their contact information is as follows. Phone: (248) 370-3266; TTY: (248) 370-3268; Fax: (248)
370-4989; E-mail: dss@oakland.edu.

Academic Conduct Policy

Students are expected to comply with the Academic Conduct Policy of the Oakland University. Suspected breaches of academic honesty will be taken before the Academic Conduct Committee. Academic misconduct includes—but not limited to—cheating in quizzes and exams, unauthorized collaborations in assignments, and plagiarizing the work of others. Students found guilty of academic misconduct in this course will receive a grade 0.0 for the course in addition to any penalties imposed by the conduct committee. Please refer to the undergraduate catalog as well as on-line Academic Conduct Regulations from http://www.oakland.edu/deanofstudents for details. Violations of classroom policy will be reported to the Dean of Students.

Course Website

A course website is located at https://moodle.oakland.edu/moodle. This website will include notes and schedules (including exam dates) for our course. Lecture notes, home assignments, Labs will be available for download from this site. Please check this site often for updates.

Term Project Report and Presentation

The course places particular emphasis on both theoretical and practical issues of the Advanced Web Design and Application. A significant semester-long project reinforces lectures. In this project, you will apply concepts presented in class and obtain practical, hands-on experience. The course project can be completed in groups of 3-5 students. Team formation must occur before the proposal is submitted and membership will be considered fixed from that time—no switching teams will be allowed. You will propose and negotiate

your activity and its deliverables with the instructor starting with a written proposal. I encourage you to use this opportunity to do something substantial and interesting (to have a chance to receive a high grade), not try to do something easy. Typically, these activities include some initial reading and research, learning about a new tool/topic, a task that applies the learning to a new situation (e.g., creation of an example different than that in manuals/readings), a task that reflects on and evaluates the experience, and a task that prepares your deliverables. Try to use maximum tools and technologies covered in this course. Novel ideas for project are encouraged but not mandatory. The main emphasis should be on implementation using open source tools and technologies.

Each group (3-5 students) is required to present research term paper (research component of your project) during the course of the semester. Each group is supposed to select at least 4-6 papers for Term paper and presentation. Each student will summarize 1-2 papers and then team members will structure their own paper. The submitted paper should be **3-6 pages** (IEEE format). In group master students need to select 1-2 conference research papers and Doctoral students must select one Journal paper. In preparing your presentation, you may need to read additional papers which are listed in the bibliography of your chosen papers for background information, or additional information about the technique being used in the paper. Many of the papers are conference papers, which get their point across as succinctly as possible but may not give as much detail as you would like. Some of the background papers you may need are available over the web from the home pages of the authors; others are in major conference proceedings and journals which may be found in the campus library or ACM and IEEE Digital Library. All papers must be relevant to lecture topics and published during year 2011~2017. Email your selected paper in PDF to instructor for approval **at least 10 days** before your scheduled presentation. Abstract of paper should be submitted by no later than **February 01, 2018**. **Term paper is due March 30, 2018.**

Plan for your presentations of research and implementation (there will be two separate presentations/group. See schedule) to last about 30 minutes including time for Q&A. Although other groups might have read your paper before your presentation, you should not assume that everyone in audience is expert! In presentation, follow top-down approach.

I expect students in audience to be interactive and ask questions! This is an opportunity for extra credit.

NOTE: Your Term paper should be relevant to area of Semantic Web and Semantic Web of Things preferably in healthcare domain.

Format of Proposal, Term report & Project +Term paper Presentation:

Each team is required to write up **a 2 pages' project proposal and 15 slides (max) for two presentations (research work presentation and project demo presentation)**. The proposal, term report and final presentations must contain the following:

1. Title (required for proposal, both presentations and term report)
2. For proposal, term report : Abstract describing the scope of your planned work

For term paper and project presentation mention following:

- What is the problem being addressed in the paper?

- What is the technique that is being used to solve the problem?
- How does this compare with other work that has been done in the same problem area? It should be presented in tabular form so anyone in audience can compare and contrast your approach with existing ones.
- What are the major contributions and results of the paper?

3. Significance (required for all except project presentation)
4. Related work (cite at least 5 papers) (required for all except project presentation)
5. Proposed Approach + Methods + Tools and Technologies used(required for all except project presentation)
6. Plan (Scope and schedule management) (only required for proposal)
7. Evaluation and Testing Methods (required for all items)
8. Course objectives (refer above) (required for all items)
9. Demo (only for project presentations)
10. Bibliography (extra page allowed) (required for all items)
11. Others": objectives, learning experience, future work (only for term project report)

    Content: Your report should include the objectives of your project, the research problems you are addressing, the approach/methods you took for evaluation of your results, the architecture and functional components of your prototype system, three most interesting contributions of your project design and/or implementation. You are also expected to summarize (a) what you have learned through the hand-on experience of doing this project, and (b) what concepts and techniques you learned in class are used in the current project design, and (c) what concepts and techniques you learned in class can be considered for extension of your current project. (d) The objectives you have achieved.

    Format of project report: I expect the project report to be well written and documented with references. The presentation style and quality (syntax and grammar) are an important part of the evaluation and grading of your final project. Report should not exceed 12 pages. NO need to add the GUIs of project in the project report

Final Project Deliverables:

At the end of the semester, each team is required to hand in the final project deliverables, including the following items:

(1) A final project report, describing your project.

(2) Project proposal (revised version is acceptable)

(3) In-class project + research presentation (ppt file).

(4) Source code and code documentation (accessible repository of Github/Bitbucket)

(5) Executable package of your prototype

You are required to submit your final project deliverable in a winzipped file with code

documentation after the demo. At the demo, you are required to hand in a draft of your final report. You can finalize the report after the demo and submit an electronic version together with other final project deliverables.

Project classification/rubrics (for implementation part)

	Outstanding	Good	Adequate	Poor	Failing
Technical strength (Design specification)	SOA, Thin client, semantic web based components are there. Object oriented design is used and the code is easy to read.(-0%). A good implementation of semantic web could result in extra credit.	Two of three components are there. Object oriented design is used and the code is easy to read. (-5%)	One of three components are used. Neither object oriented or procedural design is used but the code is easy to read. (-7%)	None of three components are used. Neither object oriented or procedural design is used and the code is hard to read. (-5%)	
Systems built according to agreed upon scope.	System executes and performs all relevant activities described in the project scope plan. (-0%)	System executes and performs all relevant activities described in the scope plan but with some minor problems. (-1%..-10%)	System performs some (but not all) of the relevant activities described in the specifications. (-10%..-15%)	System does not properly execute or compile but represents a serious attempt at a solution. (-15%..-30%)	An academic violation has occurred. (-100%)
Documentation.	The project is very well documented. All program segments are carefully described. Variable names are well chosen, descriptive, and accurate..(-0%)	The project is mostly well documented. For the most part, the program segments are carefully described. Variable names are well chosen, descriptive, and accurate. (-2%)	The project is missing important documentation. In only some parts are the program segments carefully described, variable names well chosen, descriptive, and accurate. (-3%)	The project is missing documentation. In no parts are the program segments carefully described. Variable names are often not well chosen, descriptive, and accurate. (-5%)	

Extra credit opportunities: There is no concept of failure in CSI 5510. You have to keep on working according to best of your ability, keep yourself motivated and have to keep your team members involved. The instructor will offer three types of extra credit opportunities (up to April 17th). One of the extra credit opportunity is panel discussions. Panel discussions are aim to motivate students to read and discuss in group. Likewise, students will be given chance to revise the submission of home assignments given that the obtained points are between 50%-80%. The purpose of this activity is to ensure that assignments are not just evaluation tool but learning opportunity. Second extra credit opportunity include discussion and getting feedback from instructor about your project (Feb 14 to March 30).

Lastly, I encourage, and reward, individual efforts to build a community of active learners. Efforts to participate in class will also be awarded **bonus points** in the class.

*Tentative Schedule Winter 2018

Date	Lecture contents	Home Assignments	Term Paper Presentation	Project
Jan 03	Course and class Introduction, survey of background knowledge, Semester plan, Discussion of syllabus			
Jan 08	Evolution of web, XML constructs, Well-formed and Valid XML, DTD.			Team Formation for Course Project
Jan 10	XML Schema, XML Parsing, JAXP, DOM API, SAX API	HW1		
Jan 15	**Martin Luther King, Jr. Day — No class**			
Jan 17	XML Parsing, JAXP, DOM API, SAX API			
Jan 22	JAXB implementation			
Jan 24	Panel Discussion, Building foundation for term project: Overview of HTML 5, JSON and Node.js app server (Group 1 and 2)			
Jan 29	Panel Discussion, Building foundation for term project NoSQL Database model and Introduction of MongoDBServer, JavaScript/JQuery Mobile/JQuery (Group 3 and 4)	HW1 Due		Project Proposal Due
Jan 31	Introduction to AJAX			
Feb 5	Service Oriented Architecture			
Feb 7	SOAP, WSDL, UDDI			
Feb 12	RESTful Web Services	HW 2		
Feb 14	Servlets: An introduction			
	Winter Break			
Feb 26	Security in web applications			
Feb 28	Create and deploy MVC web applications	HW 2 Due , HW3		
Mar 05	Servlets: Request and response			
Mar 07	Multi-threaded Servlets			
Mar 12	Web app: Attributes and listeners			

Mar 14	Session Management in Enterprise application			
Mar 19	Semantic Web Intro			
Mar 21	RDF Model	HW3 due		
Mar 26	Knowledge model using RDFS & OWL			
Mar 28	Knowledge model using RDFS & OWL	HW4	Term Paper + Presentation Report Due (March 30)	
Apr 02	Ontology Engineering			Term paper Presentation Group 1and Group 2 (30 minute / group)
Apr 04	Querying Semantic Web with SPARQL			Term paper Presentation Group 03 and 04(30 minute/ group)
Apr 09	Querying Semantic Web with SPARQL using Jena SPARQL API	HW4 due		Project Presentation group 1 and 2 (30 minute/ group)
Apr 11	Semantic web application development and knowledge enrichment using Jena APIs			project Presentation group 3 and 4 (30 minute/ group)
Apr 16	Semantic web application development and knowledge enrichment using Jena APIs (Introduction of Linked Data)			
April 18 and April 23	Study day			
April 25	Final Exam (7:00 to 10:00 pm)			

Note: Lecture topics and project assignments are subject to continuous change at the discretion of the instructor