CSC 423: Web Application Development

Fall 2019

Instructor: Dr. Jerry Ajay
Office: Brown 104
E-mail: JAjay@brockport.edu
Class Time: TR 5:00 – 6:15 PM (Edwards 102)
Webpage: https://jerryajay.com/cse-423-523-web-application-development/
Office Hours: Will be decided in the 1st week of class. It's essential to meet the Professor on Aug 30th anytime between 10-5PM to let me gauge appropriate timings for office hours.

Text:

- **Programming for the World-Wide Web,** Robert W. Sebesta, Pearson Education, 8th Edition/ 2015.
- Course materials on webpage.

Course Description:
Covers the basic principles involved in developing Web-based Applications that operate with a back-end relational database. Includes these topics: basics of HTTP-based client-server systems, web page creation with XHTML/CSS, client-side scripting, server-side software development, interfacing to relational databases, model-view separation, database serialization/viewing using XML/XSLT. Requires team project involving design/setup of database server and development of application interfacing to database. 3 Credits.

Prerequisite:
CSC 209 : UNIX Tools
CSC 422 : Relational Database Design

Course Objectives:

1. Understand the basic concepts of Web-based client-server systems. Gain a fundamental understanding of the HTTP protocol.
2. Gain experience in developing web pages with (X)HTML and Cascading Style Sheets (CSS).
3. Gain experience with a client-side scripting language like JavaScript.
4. Obtain extensive knowledge of, and experience with, a server-side application development language like PHP.
5. Obtain experience with developing web-based applications that enhance maintainability through the separation of business logic components from the presentation (model-view separation).
6. Gain knowledge of interfacing application to a relational database back-end (e.g, mySQL).
7. Gain knowledge of, and experience with, XML and XSLT.

8. Gain exposure to advanced Web Development techniques like Ajax and JavaScript Object Notation (JSON)
9. Be able to analyze a reasonably complex problem from stated requirements and design it as an application suitable for web-based implementation.
10. Work as a member of a team to analyze, design and implement such an application.

Workload and Evaluation Scheme:

Programming Assignments (2 individual assignments)	10%
Term Project	35%
Mid-Term	20%
Quizzes (5 pop quizzes)	15%
Comprehensive Final Examination	20%

Grading Policy:

Assume that your cumulative numerical grade for the course (i.e., the total normalized points you have after the final exam) is represented by the variable X. The maximum value that X can have is 100.0

$100.0 \geq X \geq 95.0$	A	$77.5 > X \geq 74.5$	C
$95.0 > X \geq 91.0$	A-	$74.5 > X \geq 70.5$	C-
$91.0 > X \geq 87.5$	B+	$70.5 > X \geq 67.5$	D+
$87.5 > X \geq 84.5$	B	$67.5 > X \geq 64.5$	D
$84.5 > X \geq 81.5$	B-	$64.5 > X \geq 61.5$	D-
$81.5 > X \geq 77.5$	C+	$X < 61.5$	E

Policy on Assignments and Academic Integrity:

Programming assignments will involve both web page design and programming work. Instructions and requirements for each assignment will be handed out with the actual assignment itself. You will typically have 10 days to 2 weeks from the date the assignment is handed out in class to complete your assignment. The assignments are due in class on the date of submission. It will be your responsibility to ensure that you have picked up the assignment around the time it is handed out, even if you were absent from class on that day. You may download the assignment from the course webpage. Late assignments will suffer a penalty of 10% of the total grade for each day it is late. Hence, if 10 points is the maximum possible grade for each assignment, 1 point will be lost for each 24-hour period. Assignments will not normally be accepted beyond the 48-hour time limit. Exceptions will only be made in those cases where the prior permission of the instructor has been obtained. Such permission should be applied for within 48 hours of the assignment being handed out, and a valid reason provided. It is up to the discretion of the instructor to grant such permission, and fix a new submission date. In the event of illness or any such event that causes you to be absent from class or other academic activity, you must contact me within 24 hours of the first day that you were unable to perform your academic duties. You may contact the Professor via e-mail.

Resubmission of an assignment will not normally be allowed. The first submission handed in for any particular assignment will be considered as complete. What you submit should be your final definitive word, and will be graded as such. Acceptance of any resubmitted assignment, especially after the due date, is completely at the discretion of the instructor.

All assignments not explicitly identified as group assignments are to be completed on an individual basis – i.e., on your own. Group efforts are *not* allowed for Programming Assignments. The (X)HTML, CSS, JavaScript and XML code you submit for your assignments must be your own, and not similar to the code of others in the class, and/or other code available elsewhere. When acts of academic dishonesties occur, college policies and procedures will be followed, often leading to severe penalties.

E-mail submission of assignments will **not** be accepted. They must be in hard copy. Additional clarifying material for an assignment originally submitted in hard copy will also not be accepted via e-mail. It is, however, possible that some assignments will be demonstrated in class, and the code for these may be accepted via email.

Examination schedule:

The mid-term examination will be administered within a week after at least six weeks of instruction have been completed. This typically means that in the Fall semester the exam will be held during the second class of the week in the second week of October (the week just before the week containing the 2-day break in October). The final examination will be comprehensive, and will be administered during Finals Week. Quizzes will be conducted unannounced in class to test the preparedness of the course material. You can expect 5 quizzes in the course of the semester. Expect the quizzes to be simple as compared to the exams.

No make-up exams or quizzes will be given. If you are going to be in a position where you will be required to miss a quiz or an exam due to unavoidable reasons, you should inform me at least a week in advance. If an emergency prevents you from coming to the exam, you should let me know as soon as possible after the exam, and we will need to work something out for that exam grade. This will be decided by mutual consultation.

Outline of course:

The principal aim of this course is to make you familiar with, and give you adequate practice with, technologies used to develop a web-based application. These include a variety of technologies for the client side (i.e., the computer on which you run your browser), and also on the server side (i.e., the computer that 'hosts' the URL you go to from your browser). Familiarity with these techniques has been considered a very useful skill to have, as many contemporary applications developed are web, rather than desktop based.

The basic outline of the course (i.e., the set of topics covered and practice exercises done in and out of class) is as listed below. Note that coverage of this set might change over the course of the

semester depending on the instructor's monitoring of the class' progress, measured by the instructor's estimate of the students' overall "mastery" of the various topics.

a. Introduction to Client-Server systems and the HTTP Protocol
   - Discuss the concepts of domain names, IP addresses, web browsers, web servers, and URLs.
   - Discuss the basic 3-tier web application model (GUI front end, middle tier implementing business logic, database back end) **(Weeks 1 & 2)**
b. Basic web page development techniques: XHTML, CSS **(Weeks 2 & 3)**
c. Browser scripting techniques: JavaScript, and its role in validating user entered data on client side **(Weeks 4 & 5)**
d. Server-side software development: CGI, PHP, processing data from web forms, session management **(Weeks 6, 7 & 8)**
e. Web database access: access to a popular web database (e.g., mySQL) **(Weeks 8 & 9)**
f. Protecting against security holes in web applications – for example, protecting the application from issues like HTML injection, JavaScript injection and SQL injection **(Week 10)**
g. XML and XSLT: Particular emphasis on how XSLT can be used to display XML documents in user-friendly form on a browser **(Week 11)**
h. Modeling a significantly large problem in a manner suitable for web-based implementation: ensuring separation of business and presentation logic in the design (mainly in the second half of the semester)
i. Implementing and deploying a reasonably large application using appropriate software tools (e.g., PHPmyadmin, WinSCP) (mainly in the second half of the semester)
j. Coverage of advanced topics such as Ajax (for asynchronous communication between client and server), and JSON (Javascript Object Notation – an alternative data exchange format to XML being used nowadays) **(Week 12)**

Approximately 2 weeks will be used for in-class exams and project progress demonstrations.

Miscellaneous:

Use of e-mail: E-mail may also be used to set up appointments with me beyond normal office hours. In case of general questions such as program-correctness/logistics/course-material, please direct the questions to Piazza.

Policy on Attendance: College Senate legislation mandates student attendance in all classes. Students who are unable to attend the examinations or meet deadlines for assignments on particular days due to religious or familial beliefs must contact me ahead and work out alternative arrangements. Late arrivals and early departures disturb the entire class and should be avoided. College Senate policy states that 15% or more absences (4 classes) are grounds for failure. The policy allows instructors to establish a more restrictive attendance policy. Note that this class has a team project component, and a lot of team work may be done in class. By missing class without a good reason, you are letting your team down. Consequently, you may be penalized for that (see "Policy on Team Work" below). Therefore, students whose unexcused absences exceed **7 percent** of the scheduled classes (i.e., **two classes**) may receive a lower final letter grade **or even a fail grade for the course** at the instructor's discretion. The instructor will consider the extent to which your team suffered due to your absence in determining the penalty. You are responsible for making up any materials that are covered in classes you missed.

<u>Policy on Team Work</u> (derived from the policy stipulated by Binghamton University's undergraduate course on Software Engineering):

- Teams will be established by the second week of class. Team composition will be determined by the instructor, *possibly* in consultation with the students. A student's past academic performance may be taken into consideration. Note that the final composition of each team is ultimately the instructor's decision. Students may expect that the composition and work allocation to each team will change throughout the semester
- Once projects are underway, each team member will have a primary role to play within their team
  - This role can and may change during the course of the semester
- Each team MUST have one team lead
  - The team lead will coordinate team activities, collect weekly "timesheets", keep team member attendance records at meetings, and deliver a team progress report (using input from each team member) to the instructor every two weeks
  - In return for these additional responsibilities, the team lead will receive a bonus (at the instructor's discretion) for all the work submitted during the lead's tenure
  - The role of team lead can rotate among different students in the course of the semester. This may occur at the team members', or the instructor's, initiative. The final assignment of a team lead role to a student, for a particular period of time, is decided (and/or approved) by the instructor. The instructor will assign the first team lead.
- Project grades
  - The grade received for each project phase will be a team grade (i.e., the same grade will be given to all members of the team), with the exception noted below
  - **Any team member that does not carry out his/her assigned role satisfactorily, does not participate in team meetings adequately, or does not complete his/her part of each team deliverable, will get a zero (0) for the corresponding deliverable (project phase). The instructor will take input from the team lead, peer evaluations and his/her own observations of team work into consideration in deciding this grade.**

<u>Disability Statement:</u> Students with documented disabilities may be entitled to specific accommodations. SUNY Brockport's Office for Students with Disabilities makes this determination. Please contact the Office for Students with Disabilities at (585) 395-5409 or osdoffic@brockport.edu to inquire about obtaining an official letter to the course instructor detailing approved accommodations. The student is responsible for providing the course instructor with the official letter. Faculty and staff work as a team with the Office for Students with Disabilities to meet the needs of students with disabilities.

<u>Title IX Compliance:</u> Gender discrimination and sexual harassment are prohibited in class. Title IX legislation requires the College to provide gender equity in all areas of campus life. If you or someone you know has experienced gender discrimination, sexual harassment, or sexual assault,

we encourage you to seek assistance and to report the incident through resources available at www.brockport.edu/titleix/index.html. Confidential assistance is available at Hazen Center for Integrated Care. For these and other regulations governing campus life, please see all of our Student Polices at www.brockport.edu/policies/index.php.

Evacuation Policy: All fire alarms, emergency voice notification system messages, etc., are to be taken seriously, especially in this time of heightened security awareness and the potential need to evacuate a building for other reasons such as an emergency response to a spill or other event. Evacuation of the facility is mandatory until the signal to reenter has been given by the Brockport Fire Department, University Police, or Environmental Health and Safety personnel.

Evacuation Procedures:
- Stairwells in the building will be used for the evacuation of the building – proceed to the **nearest exit sign**, which MAY NOT be the way you entered the building.
- The elevators will not be used as they are programmed to shut down during a fire alarm.
- When the alarm is sounded, all occupants will use the **nearest exit.** If that stairway is not usable, go to the next closest stairway.
- Doors and, if possible, windows, should be closed as the last person leaves a room or area.
- When the alarms sound, evacuate the building quickly, but do not run. Do not panic.
- Persons who walk slowly or have difficulties with stairs should walk to the right.
- Leave the vicinity of the building so that **emergency personnel** will have access to the building.
- Proceed to your muster point/designated assembly area for your floor. The designated area should be relayed to your group by the faculty instructor, staff member, building coordinator or otherwise indicated in the fire evacuation plan/signage. A head count needs to be taken at the designated area to ensure all occupants have left the building.
- Never re-enter a building without the all clear from the **Fire Department, University Police, or Environmental Health and Safety personnel.**

In the event of the fire alarm, please gather your belongings and calmly go to the nearest exit. Once you are outside the building, please gather just outside the building where the class is held – this is where the whole class will gather together. If you cannot find the class group outside the building, please stay away from the building until it has been cleared for reentry by the Fire Department, University Police, and/or College personnel. If you feel you may need assistance to exit the building, please notify me as soon as reasonably possible.

Weather Conditions and Class Cancellation: I have no authority to cancel classes, no matter what the weather condition is. Only the President of the College makes that decision. On days of severe weather conditions, please listen to WBSU (89.9 FM) and WHAM (1180 AM) for class cancellations. You may also call (585) 395-COLD at the College. If I have any information, I will try my best to send email to the class about it.