Web-centric Computing

Dalhousie University
Computer Science 3172
Course CRN 13173, Tutorial CRN 14702*

Fall 2009/2010

Lecture Time:	Mondays & Wednesdays 3:35 – 4:55pm
Lecture Room:	Computer Science Lab #1
Professor:	James Blustein
	Office Hours: Tues. 1:45 – 3:15pm & Wed. 11:30am – 12:30pm, or by appointment
Office:	Computer Science 223
E-mail:	⟨jamie@cs.dal.ca⟩
Telephone:	494-6104
Course website:	⟨URL: http://users.cs.dal.ca/~jamie/course/CS/3172/⟩
(alias)	⟨URL: http://www.cs.dal.ca/~jamie/CS3172/⟩
Recommended Textbooks:	(1) HTTP: The Definitive Guide by David Gourley & Briant Totty (with others). © 2002 by O'Reilly & Assocs. ISBN 978-1-565-92509-0.
	(2) Programming the World Wide Web (fourth ed.) by Robert W. Sebesta © 2008 Published by Addison-Wesley. ISBN 978-0-321-489692-2.

Assessment Components:	Quizzes	5%
	Assignments & Homework	25%
	Tests (during Oct. & Nov.)	30% (15% each)
	Final exam	40%

1 Calendar Description†

This course provides a solid grasp of core WWW technologies and a conceptual framework for understanding the development of the WWW and working with future web technologies. The course explores interactive and non-interactive web applications built using various technologies and architectural models. We explore the significance of web design and programming concepts in terms of accessibility issues both from the perspective of web robots and end-users. Web caching, proxy techniques, and security issues are also discussed.

PREREQUISITES: CSCI 2140 & CSCI 3171, or INFX 2600 & INFX 2601
CO-REQUISITES: CSCI 3171 may be taken as a co-requisite

*3 credit hours, undergraduate course, syllabus version 12 September 2009 (1a).
The schedule and procedures in this syllabus are subject to change in the event of extenuating circumstances.
†The description is quoted from
⟨URL: http://www.registrar.dal.ca/calendar/class.php?subj=CSCI&num=3172⟩, as it was on 07 September 2008.

2 Course Content and Goals

Students who successfully complete this course will be equipped to understand a wide range of WWW-based technologies including those that we will not be discussing in class.

We will examine exemplars of certain types of WWW-based technologies but we will not use everything. If you only want to learn a particular technology (ASP for example) then you should read a book or online tutorial and write some code yourself rather than taking this course. However if you want to understand the wide range of WWW-based technologies (server-side programming languages in the case of ASP), standards and their capabilities and limitations, and be ready to usefully apply ones that have not been invented yet, then this course will benefit you.

To begin we must understand in what way the WWW is a type of heterogeneous distributed system. Then we can answer the following questions:

- What is hypertext? What is the relationship between it and the WWW?
- How is programming for the WWW similar to programming for monolithic systems?
- How is it different?
- When are those differences important?
- What are some of the programming models on the modern WWW?
  - JavaScript and the DOM
  - Ajax
  - Content management systems
  - Database-driven websites
  - Middleware on the WWW
  - Applied OO (Wikis and blogs)
- What are relevant standards (as mandated by standards bodies, and in practice)?

The WWW is not exactly like any other system. Sometimes it is used to present information to people and sometimes it is used to present information to computer programs (for example agents and search engines).

As students of computer science we often think of the WWW as only a tool for providing information, sharing resources (e.g. recordings of TV programmes and music), or supporting electronic commerce (buying and selling goods and services). One common characteristic of all of those applications of the WWW is that they are webpages (or websites) produced by a single entity (that is one person or organization).

The WWW supports those activities and more. It also enables collaborative work. An interesting example of collaborative Wikis. Students will understand at least the technology necessary to make such tools function.

Unlike most programs we write for people to use, we do not know how people will get access to the documents (and program output) we produce on the WWW. Someone may view our webpage on a large desktop computer screen while someone else may hear it read to them as they drive a car. How can we use the technologies of the WWW so that people who use our webpages directly and those who use search engines, etc. can all get what we want them to get from our webpages.

- What special challenges are there for user interface (UI) design on the WWW?
- How can we simplify our job as UI developers without making interfaces that are difficult or impossible to use?

As a class we will cover topics that you will need to know to accomplish those goals in lectures and through demonstrations. Assignments along the way will help you focus your attention and

gain practical experience with aspects of the course before you confront them outside of the experimental atmosphere of this course. Written tests will give you (the individual student) and me (the professor) feedback about how well you understand the material and where I need to help the class more.

My plan for this course is for me to assign several individual programming homeworks (and perhaps one group assignment) and to spend much of the lecture time discussing other, less programming oriented, topics. We will discuss homework in class but I expect you to use the print and WWW resources available to you to learn how to complete the assignments.

2.1 The expected order of topics for Fall 2009/2010

- **Topic I: Introduction and Overview**
  (A) Introduction
  1. What is CSCI3172 about?
  2. Many answers to the question 'What is the WWW?'
  3. Introduction to this CSCI3172 website

  (B) Hypertext and the WWW
  1. definitions of hypertext
  2. potential of hypertext
  3. hypertext beyond the WWW?
     - The 7 issues
     - Universal model of WWW technologies [from HT07]
     - uncommon extensions to the basic WWW model
- **Topic II: Web Basics**
  (A) Client-side Computing on the WWW
  1. XHTML
  2. CSS
  3. Javascript

  (B) Server-side Computing on the WWW
  1. CGI
  2. SSI
  3. Servlets (with Java)

  (C) User populations
  1. current users/visitors
  2. potential visitors
  3. search engines
  4. accessibility

  (D) Summation
  - What makes a good website?
- **Topic III: Common Uses of the WWW**
  (A) Technology-heavy Applications
  1. The Stateful Web
  2. Metadata and its uses
     - `meta` and `link`
     - Dublin Core
     - folksonomies and microformats
     - The Semantic Web
       (a) introduction and overview
       (b) RDF
       (c) OWL
  3. Web Services
  4. perhaps RSS

  (B) Applied WWW Use
  1. search engines
  2. filtering
  3. 'the deep Web'
  4. blogs
  5. wikis
  6. tags
- **Topic IV: Techniques for Programming Websites**
  1. Javascript and the DOM
  2. redirection and hijacking
  3. preserving and using state
  4. Ajax
- **Topic V: 'The Web Graph'**
  1. description
  2. properties
  3. applications
  4. research avenues

Topic: Accessibility
will be covered throught the course, and
will be the focus of at least one assignment

2.2 Expectations

My rôle of your professor is not to teach as such but to *help you to learn*. You are responsible for your own learning. I will explain and motivate the material. I will give you assignments that will help you to practice and improve your skills. I will try to make the assignments interesting and challenging.

Our time in the classroom will be used for lectures, discussions, quizzes, and work in groups. I expect you to participate meaningfully in all of those activities.

When we review for a test or the exam, every student should arrive to class prepared with three potential questions *with* answers typed or neatly printed. At least some of those questions will be discussed in the class and some of the questions we discuss could appear on a test or the exam.

I expected you to attend each class and to be on-time. If you miss a class, for any reason, you are responsible for the material covered, any assignments that were given, and any announcements that were made. I will try to make copies of lecture notes, etc. available at the Killam library, through the course website, or both.

2.3 Tentative Outline

A list of the tentative topics is at ⟨URL: http://www.cs.dal.ca/~jamie/course/CS/3172/Course/goals/topics.html⟩. Those topics will be outlined in the first week of lectures. The order of topics for this year is part of the course website and is also on page 3.

We will studying primarily concepts and ideas. We will however begin with a review of some details of WWW history and standards. You will be expected to learn many of the other relevant details yourself.

I expect much of the first quiz to be about those details. Later tests and quizzes will require you to show how you use your knowledge of those details to solve problems. Certain abstract principles (such as accessibility, the user experience, security, interaction with databases and search engines) might be dealt with throughout the course.

The list of topics and order may change depending on what the class as a whole has as background knowledge and what I feel is necessary for you to get the most out of the project. Before I lecture about most topics I will assign readings for you. You will get the most benefit from the class if you have completed the assigned reading and made notes before the class. If you cannot complete the reading before the lecture and in-class discussion then you should do the reading carefully after class.

2.4 Course Dates

Week # ⇒	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**X**	⇓ *Day*
Su		13	20	27	4	11	18	25	1	8	15	22	29	6	Su
M		14	21	*28*	5	~~*12*~~	19	26	2	9	16	23	30	7	M
Tu		15	22	29	6	13	20	27	3	10	17	24	1		Tu
W		16	23	30	*7*	14	21	28	4	~~*11*~~	18	25	2		W
Th	10	17	24	1	8	15	22	29	5	12	19	26	3		Th
F	11	18	25	2	9	16	23	30	6	13	20	27	4		F
Sa	12	19	26	3	10	17	24	31	7	14	21	28	5		Sa
Day ⇑	September			October					November				Dec.		⇐ *Month*

Dr. Blustein will be away on Monday 28 September & Wednesday 07 October.
Dalhousie will be closed on Monday 12 October and Wednesday 11 November.
The Registrar's Office will schedule the exam for sometime between 09 and 19 December.

2.5 Help

You will find that there are many resources to help you in this class: your professor, the materials provided by your professor, material in the library and on the WWW, and the other students. In the end however the responsibility for learning is yours. Details of the various assignments will be discussed in class. All students are expected to do their own work!

The office hours listed on the front of this syllabus are times when I will be in or near my office. You may drop-in to discuss anything related to the course during those times. If you want to meet with me at some other times then it is best for you to make appointment, but you can also come to my office in case I have time available right then. You can make appointments in person (e.g. after class or during my office hour), by e-mail or by telephone.

3 Policies and Rules

Students are subject to all applicable University and Faculty policies. By your enrollment in this course beyond the first day you are deemed to be fully aware of all such obligations and responsibilities so most of them will not be repeated here. I do want to draw your particular attention to some of them however.

Any student wishing to discuss an **accommodation on the basis of permanent or temporary disability** is asked to register with the Student Accessibility Services in their Centre off the patio in front of the Killam library, by telephone at 494-2836, by e-mail at <access@dal.ca>, or by fax at 494-2042.

Your grade should reflect how much you can demonstrate you know and can apply about the topics of this course. If you have registered with that Office then I will be guided by their advice in deciding how you are asked to demonstrate that knowledge.

Plagiarism will not be tolerated in any part of any work submitted to the professor for any reason. You must do your own work and provide proper credit when quoting or paraphrasing the work of others. This policy applies equally to text, images, and program code. You may use any standard style guide you wish so long as you use it consistently. The reference desk at the Killam library or your professor can offer suggestions for style guides. When citing webpages you must include the following: (1) the address of the webpage, (2) the author of the webpage or a note that it is anonymous, (3) the date that the page was last updated or, if that is not available, the date that you read the page and a note to that effect. Further details are in the Academic Integrity section (beginning on page 7) on this syllabus.

3.1 Grading Scale

Faculty Council Meetings of 2004-03-23 and 2005-05-24

The definitions of grade levels are in the Dalhousie University 2009/2010 Undergraduate Calendar. I am restricted by the policy of the Faculty of Computer Science from having more than 30% of the class get $\mathcal{A}$-level grades, except in wholly unusual circumstances.

3.2 Assignments and Homework

Late assignments and homework will be accepted at the beginning of class only. If you are late for class your homework will not be accepted. The highest grade that late work will be awarded is $\mathcal{A}^-$.

For homework assignment that I ask to be submitted on paper: **Multi-page homeworks** must be neatly stapled and your name and row number must appear on the top sheet. Homeworks that are not stapled and documented will not receive full marks.

Some of your homework will be submitted by computer. I will inform you of the details of those submissions later.

3.2.1 Relative Weights

The relative weights of the first five assignments will be as below

Assignment	Weight
Assig. #1	1
Assig. #2	2
Assig. #3	2
Assig. #4	3
Assig. #5	3

If there are more than five assignments then their weights will be announced when they are assigned or before they are assigned.

3.2.2 Assignments Are Essential

You must have submitted at least 80% of the assignments and homeworks (within four days of their being due) to earn a final grade higher than $\mathcal{C}^+$ for the entire course. The figure of 80% is computed by rounding to the nearest whole number: Thus 80% of six would be five ($\lfloor (0.8 \times 6) + 0.5 \rfloor = \lfloor 4.8 + 0.5 \rfloor = \lfloor 5.3 \rfloor = 5$).

3.2.3 Late Policy

Late work will be penalized one-third of a grade level (e.g. the difference between a $\mathcal{B}^+$ and a $\mathcal{B}$ per day or part thereof).

Saturday and Sunday will count as one day for this policy. You may not receive credit for work that is more than 4 days late. The highest grade that late work will be awarded is $\mathcal{A}^-$, e.g. an assignment that would have been worth $\mathcal{A}^+$ on time but is 1 day late will earn a grade of $\mathcal{A}^-$, and an assignment that would have been worth $\mathcal{C}$ on time but is is 1 day late will earn a grade of $\mathcal{C}^-$.

3.3 Quizzes, Tests, and Exams

All tests, and quizzes will be held in the classroom. Exams will be scheduled by the Faculty and University. I will inform you (by an announcement in class, note in the Announcement section of the website, or e-mail) of any quiz or optional activity outside of normal class time.

The quizzes are intended mostly to give you and me and indication of how well you understand material recently covered. However, the first quiz might be a test of your prerequisite knowledge.

There will be no make-ups for quizzes. I will not tell you in advance when they will be but if there are more than four of them then your single lowest score will not count towards your grade.

No make-up tests will be given without my permission. You will not get my permission without either prior notice of absence, a detailed letter from your physician, or evidence of a serious family crisis that required your attention. Make-up exams and tests may be administered in essay form.

No corrections to grades for a test will be considered more than two weeks after the tests have been returned to the class.

4 Academic Integrity*

This policy applies to everything that you present or submit (in class, in assignments, etc.) as part of this class. This policy applies to the whole of everything that you present or submit and every part of everything that you present or submit. This section extends the notes on plagiarism from page 5.

At Dalhousie University, we respect the values of academic integrity: honesty, trust, fairness, responsibility and respect. As a Dalhousie student and a member of the academic community, you are expected to abide by these values and the policies which enforce them. What is academic integrity?

Academic integrity is ensuring that any work you submit is your own and that you have given appropriate acknowledgement to any sources that you consulted. 'Dalhousie University defines plagiarism as the submission or presentation of the work of another as if it were one's own. Plagiarism is considered a serious academic offence which may lead to the assignment of a failing grade, suspension or expulsion from the University.' (from Undergraduate Calendar (2008/2009) section on Intellectual Honesty, p. 23; ⟨URL: http://ug.cal.dal.ca/UREG.htm#11⟩ as of 11 Sept. 2009).

Some examples of plagiarism are:

- failure to attribute authorship when using a broad spectrum of sources such as written or oral work, computer codes/programs, artistic or architectural works, scientific projects, performances, web page designs, graphical representations, diagrams, videos, and images;
- downloading all or part of the work of another from the Internet and submitting as one's own
- the submission of an assignment or other work prepared by any person other than the individual claiming to be the author
- submitting work that has been completed through collaboration or previously submitted for another assignment without permission from your instructor

4.1 How is plagiarism detected?

Professors and TAs are highly skilled at recognizing discrepancies between writing styles, inappropriate citations, and obvious word-for-word copying. In addition, the Senate has affirmed the right of any instructor to require that student papers be submitted in both written and digital format, and to submit any paper to an originality check such as that performed by Turnitin.com for essay papers, and MOSS for software code. Copies of student essay papers checked by this process will be retained by Turnitin.com.

4.2 What happens if I am accused of plagiarism?

Instructors are required to forward any suspected cases of plagiarism to the Academic Integrity Officer (AIO) for the Faculty. You will be informed of the allegation by the AIO and a meeting will be convened. You may contact the Dalhousie Student Advocacy Service who will be able to assist you in preparing a defence. Until the case is resolved, your final grade will be an 'PND'.

*The section is adapted from the original version which is from the Faculty Resources section of Dalhousie University's Academic Integrity website ⟨URL: http://academicintegrity.dal.ca/Faculty%20Resources/index.php⟩ entitled *Academic Integrity Statement for Syllabus*. The original is dated 16 July 2008. It was copied on 25 Sept. 2008.

If you are judged to have committed an offence, penalties may include a loss of credit, '$\mathcal{F}$' in a course, suspension or expulsion from the University, or even the revocation of a degree (for more information see Dalhousie's Academic Integrity website).

4.3 How can I avoid plagiarism?

- Give appropriate credit to the sources used in all of your assignments
  - Use RefWorks to keep track of your research and edit and format bibliographies in the citation style required by the instructor — http://www.library.dal.ca/How/RefWorks
- If you are unsure about anything, contact your instructor or TA
- Prepare your assignments completely independently
- Make sure you understand Dalhousie's policies on academic integrity

4.4 Specifics for CSCI 3172

You must do your own work and provide proper credit when quoting or paraphrasing the work of others. This policy applies equally to text, images, and program code. You may use any standard style guide you wish so long as you use it consistently.

4.4.1 Webpages

When citing webpages you must include the following details:

1. the address of the webpage,
2. the author of the webpage or a note that it is anonymous,
3. the date that the page was last updated or, if that is not available, the date that you read the page and a note to that effect.

4.4.2 Images

Use of images (e.g. logos and icons) by someone else is essentially the same as quoting text. You must provide full citation information for any image that is not your own, even if the image is 'royalty free', you purchased rights to use it, or it includes the trademark symbol '™' or registered trademark symbol '®'.

If you alter an image by someone else (for example by cropping or blurring it) or you combine two or more images to make a new image then you must identify the source of the original images (just as though you had used them without alteration) and note that you have modified, combined, or modified and combined the images.

4.4.3 Algorithms and Software Code

The use of idea from another person must be accompanied by appropriate credit to that person and the location where the idea appeared (in print, on the WWW, in conversation, etc.):

If an *idea is represented in program code (or pseudocode)* then you must give credit for it just as if you copied it into an essay;

If *you translated the idea from pseudocode or a different programming language* then you must include a note to that effect as part of the citation you make to the source you used;

If you *copied the code directly* without changing the programming language then you have done the equivalent of quoting text, so you must give credit just as you would for a quotation.

4.4.4 Won't those long URLs make my webpages ugly or unusable?

You must provide all of the details for everything you use but you don't have to display all of those details on the same webpage where the text, images, code, etc. are being used. Three simple alternative solutions that will suffice for many assignments are:

- Put a brief citation in the webpage near the resource, and a complete (i.e. detailed) citation in the source code using XHTML comments.
- Include an endnote mark (an asterisk '*', dagger symbol '†', numerical citation e.g. '[1]') beside the part of the webpage that you need to provide citation information for, and include the citation information at the end of the webpage or make a link from the endnote symbol to another webpage that does have that information. You must ensure that it is clear which citation information refers to which part of the website.
- For complex lengthy webpage it may be best to include all of the references in a separate webpage that is linked to from the main webpage.

☛ In all circumstances, it is the student's responsbility to ensure that full credit is given and that it is clear whom is being credited for what.

4.5 Where can I turn for help?

Academic Integrity website — `http://academicintegrity.dal.ca` Links to policies, definitions, online tutorials, tips on citing and paraphrasing

Writing Centre — `http://writingcentre.dal.ca` Proofreading, writing styles, citations

Dalhousie Libraries — `http://www.library.dal.ca/How/Classes` Workshops, online tutorials, citation guides, Assignment Calculator, RefWorks

Dalhousie Regulations — `http://ug.cal.dal.ca/UREG.htm#12`
— `http://ug.cal.dal.ca/UREG.htm#13A`
Definitions of 'intellectual honesty' and 'academic dishonesty', respectively

5 Pandemic H1N1 Influenza Advisory in relation to Academic Continuity

See also ⟨URL: http://flu.dal.ca/⟩

The Vice-President Academic and Provost of Dalhousie University requires the following notice to appear in all syllabi for this term.

> In the event of an escalation of the pandemic H1N1 influenza virus, the University may need to authorize Academic Units to change elements of class schedules and/or evaluation plans as outlined in course syllabi. Any change is intended to support the primary goal of reducing the risk of spreading a pandemic influenza among students, faculty and staff.
>
> Although it is difficult to predict the severity of the pandemic, the University is committed to minimizing the impact on student's academic progress. Therefore, every effort will be made to provide students with options for continued learning and for continued fair evaluations.
>
> Changes may include but are not limited to:
>
> - Adjustments to course assignments;
> - Changes to the dates of exams;
> - Arrangements for alternative evaluations for students affected by H1N1 influenza virus;
> - Adjustments to work terms;
> - Modification of marks awarded for participation;
> - Adjustments to attendance policies.
>
> Any alternative plan made in individual courses may be superseded by University-wide or Government measures to reduce the spread of the pandemic H1N1 influenza virus.
>
> We will continue to seek input from you and we will keep you informed as we proceed into the 2009/10 academic term. Should you have immediate questions or suggestions please contact Susan Spence Wach, Chair, Academic Continuity Planning Group, <susan.spence.wach@dal.ca>.