



Carleton
UNIVERSITY

Department of
**Systems and
Computer Engineering**

SYSC 4504

Fundamentals of Web Development

Calendar description

WWW architecture, web servers and browsers, core protocols. Web pages, their structure, interpretation and internal representation. Client-side and server-side programming. Data representation. Interfacing with databases and other server-side services. Cookies, state management, and privacy issues. Security. Web services.

Includes: Experiential Learning Activity.

Lectures three hours a week, laboratory three hours alternate weeks.

<http://calendar.carleton.ca/undergrad/courses/SYSC/>

Prerequisites

Prerequisite(s): SYSC 2004. Additional recommended background: SYSC 4602 or SYSC 3303.

Prior knowledge

In this course, we will use two distinct OO languages (JavaScript and PHP), and the lectures will assume that students understand the basic OO concepts (classes, objects, methods). SYSC 2004 and its prerequisites will also have ensured that students mastered a certain level of maturity in writing non-trivial programs, something that will be required in this course as well.

Course objectives

Distributed Systems are ubiquitous and of unprecedented importance. Examples of the Web and Internet-based applications illustrate the development and the deployment of these architectures. In distributed systems, resources and users can be located geographically anywhere. The objective of the course is to discuss the fundamental concepts and the software solutions, in the design of a distributed system, in particular the use of WWW-related technologies. During lab sessions, students will apply the concepts presented in class in the form of WWW exercises (markup, styling, etc.) and programming exercises. Programming will be in JavaScript (client-side) and PHP (server-side), and will involve querying an SQL database.

List of topics

- How the Web Works

- Introduction to HTML
- Introduction to CCS
- HTML Tables and Forms
- JavaScript 1: Language Fundamentals
- JavaScript 2: Using JavaScript
- JavaScript Frameworks
- Introduction to Server-Side Development with PHP
- PHP Arrays and Superglobals
- Working with Databases
- Error Handling and Validation
- Managing State
- Security
- XML Processing and Web Services

Learning outcomes

By the end of this course, students should be able to:

- Understand the overall architecture of a web-based application.
- Know the basic skills required to design a static webpage (HTML, CSS).
- Be able to design forms/user input and validate the input (both on the client/browser side as well as on the server side).
- Can explain the differences and pros/cons of client-side programming versus server-side programming in web-based applications.
- Manipulate web pages on the client side via JavaScript and DOM.
- Process user input on both client-side and server-side.
- Write server-side code as part of a web-based application in PHP.
- Integrate/Interact with a relational database using SQL.
- Manage state in web-based applications.
- Use and design simple web-based services using either XML or JSON.
- Understand the basic security challenges, limitations of provided solutions in HTML/HTTP, and common approaches to defending against typical security attacks such as SQL Injection or XSS (Cross Site Scripting).

Graduate Attributes (GAs)

The Canadian Engineering Accreditation Board requires graduates of engineering programs to possess 12 attributes at the time of graduation. Activities related to the learning outcomes listed above are measured throughout the course and are part of the department's continual improvement process. Graduate attribute measurements will not be taken into consideration in determining a student's grade in the course. For more information, please visit: <https://engineerscanada.ca/>.

Graduate Attribute	Learning outcome(s)
2.1: Problem Analysis: Developed: Problem definition	1, 4, 9, 11
2.2: Problem Analysis: Developed: Approach to the problem	2, 3, 5-10
4.2: Design: Applied: Detailed design specifications and requirements	4, 11

4.4: Design: Developed: Design solution(s)	5, 8, 10
4.5: Design: Developed: Design implementation / task(s) definition	3, 7-10

Accreditation Units (AUs)

For more information about Accreditation Units, please visit:

<https://engineerscanada.ca/>.

The course has a total of 46 AUs, divided into:

- Engineering Science: 75%
- Engineering Design: 25%

Instructor and TA contact

Specific to course offering (tbd)

Textbook (or other resources)

Specific to course offering (tbd)

Evaluation and grading scheme

Specific to course offering (tbd)

Breakdown of course requirements

Specific to course offering (tbd)

Tentative week-by-week breakdown

Specific to course offering (tbd)

General regulations

Specific to course offering (tbd)