COMP 2406B Fall 2023 – Fundamentals of Web Applications



Course Outline – last updated August 29th, 2023

Introduction to Internet application development; emphasis on computer science fundamentals of technologies underlying web applications. Topics include: scripting and functional languages, language-based virtual machines, database query languages, remote procedure calls over the Internet, and performance and security concerns in modern distributed applications. Includes: Experiential Learning Activity. Precludes additional credit for SYSC 4504. **Prerequisite(s)**: (COMP 1006 or COMP 1406 or SYSC 2004) with a minimum grade of **C**-.

Course Information

Instructor	Alina Shaikhet (she/her)		
Contact	alina.shaikhet@carleton.ca		
Office	HP 5137		
Lectures (in-person)	Tuesdays & Thursdays 18:05 – 19:25		
	Room location is posted on the Public Class Schedule		
Tutorials (in-person)	Check your schedule in Carleton Central		
Lab/TA Co-ordinator	Sean Benjamin <u>seanbenjamin@cunet.carleton.ca</u>		
Course Website	https://brightspace.carleton.ca/		
Course Forum	Discord server (link is available on the course website)		

Course Delivery

- This course will be delivered in-person. This means that lectures and tutorials will be in-person on campus.
- Our course website is hosted on Brightspace. Students are required to be familiar with everything posted there. It is recommended to check our course website at least three times a week.
- The instructor and TAs will be available during scheduled hours for in-person and online office hours to answer questions about course content and assignments. A list of teaching assistants and their contact/office hours information, together with room locations, will be posted once the course starts.
- We will use Discord as our course forum. The forum is non-anonymous students will be required to use an alias that includes their first and last name, as listed on Brightspace.

Required Textbook

There will be no required textbook purchase for this course. This course will be taught from many sources, and much of the content is available freely online. A good introductory resource for the basics of JavaScript, HTML, and CSS that we will be using in the course is <u>https://www.w3schools.com/</u>. Additional resources will be posted on the course website throughout the term. If you are looking for a good introductory JavaScript/Node.js book, I would recommend the most recent edition of "<u>Eloquent JavaScript</u>" by Marijn Haverbeke. It is also free C

Necessary Equipment and Software

There will be a lot of programming throughout the course using JavaScript, HTML, and CSS. You will need to install Node.js (version 18) from <u>https://nodejs.org/en/</u>. This should also install the NPM (Node package manager), which we will need as well. You will need some tools to edit your code. One of the most popular choices is <u>Visual Studio</u> <u>Code</u>. As a web browser, it is recommended to use <u>Google Chrome</u>. Later in the course, we will start using <u>MongoDB</u>. The community edition installation resources can be downloaded from <u>here</u>.



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Learning Outcomes

By the end of this course, successful students will have demonstrated their ability to build modern full-stack web applications. They will be able to:

- create dynamic web pages.
- write a web server using middleware components.
- use data modeling and database technologies.
- design accessible user interface using principles of RESTful design.
- implement authentication, authorization, and sessions.

Topics Covered

Below is a summary of topics the course will cover:

- Markup Languages (e.g., HTML, CSS, Bootstrap)
- JavaScript
- Functional Programming and Closures
- Synchronous vs Asynchronous function calls
- Web Concepts, HTTP, HTTPS
- Client- and Server-side coding in JavaScript and data exchange with JSON
- Node.js and the NPM system
- Server-side templating (using Pug, etc.)
- JavaScript execution environments: Browsers, Node.js, and Express.js framework
- RESTful Web API's
- JSON databases (using MongoDB), and possibly SQL databases (using SQLite)
- Sessions and Cookies, AJAX, Web Sockets
- Cloud deployment and hosting (e.g., OpenStack)

A detailed breakdown of topics and a tentative calendar are available on the course website.

Assessment Scheme

Your performance in this course will be assessed using several components:

- There are **4 programming assignments**. The best 3 are worth 40% of your final grade. The lowest assignment grade will be dropped. Electronic submission enforces strict deadlines. No late assignments are accepted. Do not email your assignments to the instructor or TAs.
- Weekly quizzes give you high-level practice on the lecture-specific course material. The quizzes are untimed and will be accessible in Brightspace for several days. You will have one attempt for each quiz. There are 11 quizzes, but you can drop two quizzes with the lowest grade.
- This class has 10 compulsory **tutorials** that you must attend once a week in-person. The attendance will be recorded. The tutorials are an important part of the course and make up a substantial portion of the marks. The tutorial exercises will be posted ahead of time, and you are expected to work on them before you come to the tutorial. At the tutorial you will demonstrate your results to the supervising TA's and may be asked to make minor modifications to demonstrate your understanding. The tutorials must be completed individually.
- The final assignment is a **term project** which you will code and demonstrate by producing a YouTube video.
- There is no final exam, but you are required to achieve a grade of at least 50% on the final term project to pass the course. A grade of less than 50% on the final term project will result in a failing grade for COMP 2406.

The grades you achieve on these components will be weighted using the following scheme:

4 Assignments (3 best are counted)	40%
11 Weekly Quizzes (untimed within range; 1 attempt; 9 best quizzes are counted)	20%
10 Tutorials (8 best are counted)	20%
Final Term Project	20%



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ASSIGNMENT 1	Monday	October 9	by 23:59
ASSIGNMENT 2	Monday	October 30	by 23:59
ASSIGNMENT 3	Monday	November 13	by 23:59
ASSIGNMENT 4	Monday	November 27	by 23:59
FINAL TERM PROJECT	Friday	December 8	by 23:59

Important Dates and Deadlines in EST (Ottawa time)

Other important dates and deadlines can be found <u>here</u>, including class suspension for fall, winter breaks, and statutory holidays.

Lab/TA Co-ordinator

We have a lab/TA coordinator assigned to this course offering. The lab coordinator is responsible for organizing and overseeing the course's tutorial sections and imposing submission rules to help ensure that marking goes smoothly. If you notice any mistakes within a tutorial, have issues with a tutorial teaching assistant, or have other tutorial-related questions, the lab coordinator should be your first point of contact. The lab coordinator is also responsible for distributing assignments to teaching assistants for marking. If you are missing an assignment grade or are unsure about the status of your assignment, you can contact the lab coordinator.

Important Considerations

Assignments, quizzes, tutorials, and the final project must be completed individually. Collaboration between students is strictly disallowed and will be reported to the Dean of Science as an academic integrity offence. Penalties for such offences can be found on the <u>ODS web page</u>. Students must complete all coursework by themselves.

Late assignments/project, quizzes, and tutorials are never accepted for any reason. Technical problems do not exempt you from this requirement, so if you wait until the last minute and then have issues with your connection, you will still receive a mark of zero. Consequently, you are advised to:

- periodically submit your progress (i.e., upload partially completed assignments and tutorials),
- attempt to submit your final submission at least one hour in advance of the due date and time,
- download your submission and verify the contents after submitting.

If your submission is improperly packaged or your code is not running for whatever reason, you will get a mark of zero.

Assignments are posted well in advance of their due dates. **Illness does not excuse a student from completing an assignment**. No provision is made for missed assignments, and no extra credit assignments will be available.

A student may miss up to 1 assignment, 2 tutorials, and 2 quizzes for medical, compassionate, or other reasons without penalty. If you miss more than that, a mark of zero will be used for the missed items when the final grade is computed.

If you wish to appeal a mark (assignment, quiz, or tutorial) you must **make the appeal within 7 days** of the mark being posted on Brightspace. After that we will not be obliged to accept appeals or change marks.

Students are asked to pose all questions related to course content using the official Discord forum; students should avoid emailing the instructor directly unless the question contains confidential information or is of a personal nature.



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Course Copyright

All materials created for this course (i.e., video recordings, course notes, coding examples, PowerPoint slides, assignments, quizzes, tutorials, and code bases) remain the intellectual property of the instructor and are protected by copyright. They are intended for the personal and non-transferable use of students registered in the course. Reproducing, reposting, and/or redistributing any course materials, in part or in whole, without the written consent of the instructor, is a copyright violation and is strictly prohibited. Many students are eager to post their work on GitHub but you must be careful not to include copyrighted material.

Collaboration & Academic Integrity

Everything you submit for marks in this course (i.e., assignments, quizzes, examinations, etc.) must be the result of your own work and must be completed **individually**. Collaborating on any course work is strictly disallowed and will be reported as an academic integrity offence. You are never permitted to copy (or copy and modify) solutions (even if incomplete) from anyone or from the Internet. It is also a serious offense to help someone else commit plagiarism. You are never permitted to provide another person access to the rough work, assignment/quiz specifications, or source code that you or anyone else has written. If you suspect that someone has been able to acquire a copy of your work, then you must inform the instructor of the course immediately. Please also note that **electronic tools may be used to analyze and compare submissions** to ensure that no instances of academic misconduct have been committed.

If you are unsure of the expectations regarding academic integrity (how to use and cite references, if collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must **ASK** your instructor. Sharing assignment, tutorial, or quiz specifications/solutions or posting them online (to sites like Chegg, CourseHero, OneClass, etc. or even GitHub) is **ALWAYS** considered academic misconduct. You are **NEVER** permitted to post, share, or upload course materials and your course work without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process, and penalties for such offences can be found on the ODS webpage: https://science.carleton.ca/students/academic-integrity/.

Examples of academic integrity offences include: giving/emailing your solutions (even if incomplete) to other students; posting course materials or solutions to a website (including GitHub) at any time (even after the conclusion of the course); copying solutions from any sources, even cited ones; working with other students; getting help from anyone other than the course TAs or the instructor; submitting solutions (even if incomplete), written by anyone other than the student submitting the work.

All of the assessed activities in this course (including assignments, quizzes, midterm, final exam) are designed to be completed by an individual working alone. Unless it is explicitly stated otherwise, the use of any artificial intelligence tool will be considered academic misconduct. This includes, but is not limited to, ChatGPT, Copilot, etc.

SCS Computer Laboratory

SCS students can access one of the designated labs for your course. The lab schedule can be found at: <u>https://carleton.ca/scs/tech-support/computer-laboratories/</u>. All SCS computer lab and technical support information can be found at: <u>https://carleton.ca/scs/technical-support/</u>. Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing <u>SCS.Tech.Support@cunet.carleton.ca</u>.



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Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; or by email at <u>scs.ug.advisor@cunet.carleton.ca</u>. The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

University Policies

Academic Calendar. For information about Carleton's academic year, including registration and withdrawal dates, see <u>Carleton's Academic Calendar</u>.

Academic Accommodations. Carleton is committed to providing academic accessibility for all individuals. Please review the academic accommodation available to students here: <u>https://students.carleton.ca/course-outline/</u>.

Student Academic Integrity Policy. Every student should be familiar with the Carleton University Student Academic Integrity policy. A student found in violation of academic integrity standards may be sanctioned with penalties which range from a reprimand to receiving a grade of F in the course, or even being suspended or expelled from the University. Examples of punishable offences include plagiarism and unauthorized collaboration. Any such reported offences will be reviewed by the office of the Dean of Science. More information on this policy may be found on the ODS Academic Integrity page: https://carleton.ca/registrar/academic-integrity/.

Plagiarism. As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science. More information and standard sanction guidelines can be found here: <u>https://science.carleton.ca/students/academic-integrity/</u>.

Unauthorized Collaboration. Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis".

Use of AI Systems (e.g., ChatGPT, etc.). Many of the assessed activities in this course were designed to be completed by an individual student working alone. Unless it is explicitly stated otherwise, the use of any AI tool to complete work will be considered academic misconduct. This includes, but is not limited to, chatbots (e.g., ChatGPT, Google Bard, Bing Chart), research assistants (e.g., Elicit), and image generators (e.g., Stable Diffusion, Dall-E), etc.

Students are invited to discuss any concerns with the instructor at the earliest opportunity.