Course Outline

COMP2406 – Fundamentals of Web Applications

Description

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) with a minimum grade of **C-**.

Course Information

Instructors	**Mark Lanthier, Andrew Runka**
Contact	lanthier@scs.carleton.ca, arunka@scs.carleton.ca
Office	HP 5380, HP 5368
Section A Class Time:	Tue/Thu - 2:35pm-3:55pm
Section B Class Time:	Mon/Wed - 4:05pm-5:25pm
	Room location is posted on Carleton Central
Lab/TA Co-ordinator	**Lars Doyle (LarsDoyle@cunet.carleton.ca)**
Course Website	https://brightspace.carleton.ca/
Course Forum	Discord server (link is available on the course website)

Topics Covered

Below is a summary of topics the course will cover:

- Markup Languages (e.g., HTML, CSS)
- JavaScript
- Synchronous vs Asynchronous function calls
- Web Concepts, HTTP, HTTPS
- Client-side & Server-side coding in JavaScript and data exchange with JSON, AJAX
- Node.js and the NPM system
- Server-side templating (using EJS, PUG, etc.)
- JavaScript execution environments: Browsers, Node.js, and Express.js framework
- RESTful Web API's
- JSON databases (using MongoDB)
- Authentication and Authorization using Sessions and Cookies

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

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 including middleware components.
- use data modeling and database technologies.
- design accessible user interface using principles of RESTful design.
- implement authentication, authorization, and sessions.

Course Delivery

Lectures will be provided each week as pre-recorded **asynchronous online videos**, available on the course Brightspace. Lectures will be accompanied by **slides, code examples** and **supplementary material**.

Students are expected to watch designated lectures each week at a time of their own choosing. The length of the recorded lectures will vary each week (e.g., the first week is the longest, with 4 hours of lecture videos to watch, while some later weeks only have 1.5 hours). To save time, some students watch the videos at a speed of 1.25x. The recorded lectures follow closely to the course notes, so you have optionally read those instead.

The **Monday** (section B) and **Tuesday** (section A) class times will be used as **ONLINE** instructional support, where you can come to get help on lecture/course material. This time may be used at times for review of completed quizzes or assignments.

The **Wednesday** (section B) and **Thursday** (section A) class times will be used for **IN-PERSON** weekly quizzes that ALL students are expected to attend.

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.

We will use **Discord** as our course forum. The forum is not anonymous. Students will be required to use an alias that includes their first and last name, as listed on Brightspace.

Textbook and Course Notes

Students are not required to purchase textbooks or other learning materials for this course. Starting this year, this course now has **413** pages of course notes freely available (online), that covers the essential material for the course. These notes provide an introduction to all topics in the course but there are many more detailed sources available freely online that students may use. A good introductory resource for the basics of **JavaScript**, **HTML**, and **CSS** that we will be using in the course is https://www.w3schools.com/. Additional resources will be posted on the course website as weekly readings. If you are looking for a good introductory **JavaScript**/**Node.js** book, I would recommend the most recent edition of "Eloquent JavaScript" by Marijn Haverbeke. It is also free!

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** from https://nodejs.org/en/. 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 Visual Studio Code. As a web browser, it is recommended to use Google Chrome. Later in the course, we will start using MongoDB. The community edition installation resources can be downloaded from here. You should also install Mongosh (the MongoDB shell client).

Assessment Scheme

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

- There are **4 programming assignments**. Electronic submission enforces strict deadlines. Assignments must be handed in before or on the due date and time.
- There are **10 weekly in-person quizzes** to evaluate your understanding of the course material (starting January 21). Quizzes will be taken during scheduled lecture times. Only the best 8 quizzes will count towards your final grade.
- This class has **12 weekly tutorials.** Tutorials are intended to help you put lecture and reading material concepts into practice. Tutorials will NOT be graded, but their completion is strongly encouraged to help you with the assignments and quizzes. Tutorials will be available online.
- There is a mandatory **final exam** which will be scheduled later in the semester. There is no double pass rule in this course.

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

Component	Quantity	Weight	Total Weight	Tentative Dates
Assignments	4	5% each	20%	Due every 3 weeks, approx.
Quizzes	Best 8 of 10	7.5% each	60%	Weekly, during scheduled lectures
Final Exam	1		20%	Formally schedule exam, TBA

A calendar of course due dates will be posted to BrightSpace. Other important dates and deadlines can be found here, including class suspension for fall, winter breaks, and statutory holidays.

Assignment Policies

- All assignments submitted through BrightSpace before the due date will be graded for feedback by the course staff.
- All assignments will be counted towards your final grade, and no extra credit assignments will be provided.
- Any work submitted for grading must be your own individual and original work, unless stated otherwise.
- You should take the time to ensure that assignments are neat, legible and easy to understand. A portion of your grade for assignments may be given for the readability of them and for your demonstration that you have completed the assigned tasks, in the forms of documentation and testing.
- Assignments are due at 11:59pm on the due date. **Partially-late assignments will be accepted**. For every **15 minute** interval that an assignment is **late**, there will be a deduction of **1%** off the grade. Hence, for example, an assignment that is late by 3 hours and 5 minutes will have a deduction of 13%. After 25 hours ... the deduction is 100% and the assignment will not even be graded.
- It is recommended that you submit your assignment at least 60 minutes before the deadline to avoid any last-minute issues. Being "sick" on the day an assignment is due is not a valid excuse for not handing anything in.
- Do not email your assignments to the instructor or TAs.
- It is your responsibility to ENSURE that your submission was successful. **Submitting the wrong file or failure to correctly submit your work will result in a mark of zero for that assignment**. Consequently, after you upload your submission to BrightSpace you must re-download it immediately and ensure that it is the correct type of file, it has the correct filename, and that it can be opened/run (as appropriate).
- You will be provided with feedback on your assignment through BrightSpace. You should ensure that the posted marks are correct. Any concerns regarding assignment marks should be brought to the attention of the person who marked it.
- Regrading requests must be done **no later than one week** after the assignment has been returned to you. After this time, no remarking will be done.
- If any instructions are unclear, please ask for clarification. Incorrect assumptions or misunderstood directions will not be accepted as valid excuses. It is your responsibility to ensure you understand the question(s) completely.

Weekly Quizzes

Weekly quizzes will be held during the 2nd scheduled lecture time each week, starting January 21st. Completion of these quizzes is a mandatory component of the course. The best **8 of 10** quizzes will be counted towards your final grade. **No deferred quizzes will be given**.

You must attend and write the quiz for the section which you are registered. **If you write the quiz for a different section you will receive a grade of zero.**

These quizzes are expected to be completed individually, and without electronic aid; any communication or access of electronic devices (e.g. cellphones) during the quiz will be considered cheating. You must attend, write, and submit your quiz immediately upon completion in order to be graded.

Final Exam

The time and place, as well as the format of the final exam will be announced later in the term. Attendance of this exam is mandatory. Do not make travel plans until the dates are known as no advance exams will be given. The exam period can be found at http://carleton.ca/registrar/registration/dates-and-deadlines/. The deferral process for formally scheduled exams is handled through the registrar's office, see the registrars website for more details.

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.

Academic Integrity & Collaboration Policy

Although sharing of ideas among peers is encouraged, sharing of solutions, source code, plans, or any portion of gradable material is prohibited. **Collaborating on quizzes, tests, assignments or final exams is strictly disallowed.** You must complete the work by and for yourself. You are never permitted to copy (or copy and modify) solutions (even if incomplete) from anyone or from the Internet. If you need help please use the course forum, see a TA, or contact your instructor.

Any coursework that you submit for grades must be your own original solutions developed specifically for the currently registered course offering. Any work submitted that does not meet this description will be considered an act of plagiarism. To ensure that no instances of academic misconduct have been committed, electronic tools may be used to analyze and compare submissions.

Please note, that it is also a serious offense to aid another student in committing plagiarism. This includes (but is not limited to): sharing source code or other assignment, test, or tutorial solutions in part or in full, in person or in posting whether on the course forum, github or other online source repository, hallway noticeboard, or elsewhere. You are NEVER permitted to post, share, or upload course materials or your course work solutions to any third party server without explicit permission from your instructor.

***** New A.I. Policy *****

This is a course with a lot of syntax variations due to the many packages that we will be using. It can be difficult to find and understand errors that you will encounter within your code. Therefore, in this course, **we will allow the use of artificial intelligence tools** (e.g. ChatGPT, Copilot, etc.) **for debugging purposes**. You can ask the AI to check your code for errors, and it will often give useful tips to help you correct your errors.

If you are submitting work that was completed with the help of AI, **you are required to include a brief disclosure statement explaining how AI was used**. This should specify clearly which parts of the work are your own work, and which parts were influenced by AI output (e.g., suggested fixes, explanations, or code changes). Failure to cite AI sources used in any work submitted for academic credit may be considered plagiarism under the course and university policies.

Please be VERY careful in the way that you use these A.I. tools. If you rely heavily on it, without taking time to think about your programming errors first, it is all too easy to have the A.I. fix your errors without you gaining a proper understanding of what was done. As a result, you can very easily fail the weekly quizzes and final exam because you will not have gained an understanding of the material.

For more information regarding Academic Integrity at Carleton including the policies, best practices, and the standard sanctions for misconduct, please visit the Faculty of Science website.

Copyright & Fair use of materials

Electronic Communication

To ensure that all course announcements are received, **students are expected to check their Carleton email on a daily basis.**

Students are asked to post all questions related to **course content** using the official **course Discord server**. Questions regarding the **grading** of your test/assignment should be directed **to the individual who marked it**. If your question is private or individual in nature please do not hesitate to contact the TAs or instructor via email. In order to ensure accuracy and accountability, **ALL** requests for course accommodations must be done via email to the instructor. No accommodations will be made for course deliverables after the deadline has passed.

Emails to the TAs or instructor **must be from your cmail account** and **must include the course name in the subject line.** Failure to do so may result in delays in response times or your message being missed completely. The instructors will attempt to answer every course-related email within 2 business days of the time it is received.

SCS Computer Laboratory

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

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; or by email at scs.ug.advisor@cunet.carleton.ca. 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 Carleton's Academic Calendar.

Academic Accommodations. Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website:
https://students.carleton.ca/course-outline/.

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: https://science.carleton.ca/students/academic-integrity/.

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.