COURSE SYLLABUS
Lassonde School of Engineering
Electrical Engineering and Computer Science

LE / EECS 1720 3.0 Section M
BUILDING INTERACTIVE SYSTEMS
Winter 2022

Course Title:	EECS 1720: Building Interactive Systems
Term:	Winter 2022
Lectures:	Tue, Thu 2:30pm–4:00pm Location: TBA (Zoom)
Laboratories:	Lab 1: Wed 12:30pm–2:00pm, Haolin Lab 2: Wed 12:30pm–2:00pm, Taha Lab 3: Wed 12:30pm–2:00pm, Mehrnaz Lab 4: Wed 12:30pm–2:00pm, w/Lab 3
Term Dates:	Jan 10, 2022–Apr 10, 2022 Study Day (Apr 11, 2022), Exam Period (Apr 12-29, 2022)
Last Day to Add:	Jan 23, 2022 (without permission); Feb 7, 2022 (with)
Last Day to Drop:	Mar 18, 2022 (no grade); Mar 19–Apr 10 ('W' on transcript)
Instructor:	Sarah Vollmer Email: workscv@yorku.ca Web: TBA
Office Hours:	By appointment and/or Discord Server: T,W,R after lecture/lab
TAs:	Harry Thasarathan, Mehrnaz Zhian, Haolin Sun, Taha Sajjad
Course Website:	https://www.eecs.yorku.ca/course_archive/2021-22/W/1720/

COURSE CALENDAR DESCRIPTION

A second course teaching more advanced programming concepts within the context of image, sound and interaction using an object-oriented language; introduction to interactive systems, user interfaces, event-driven programming, object design and inheritance; implementation using debuggers, integrated development environments, user interface builders. Winter 2022: Augmented Reality Class Exhibit

Prerequisite: LE/EECS 1710 3.00 - Programming For Digital Media.
Course credit exclusions: LE/EECS 1020 3.00, LE/EECS 1022 3.00, AP/ITEC 1620 3.00.

EXPANDED DESCRIPTION

Topics will most likely include the following (at a 1st year undergraduate level):
• User Interfaces (UIs), UI Elements, Guidelines for UI design
• User Interface Builders, Integrated Development Environments
• Objects, classes and inheritance
• Interactive WWW -based systems - basic network concepts, guidelines for design
• Event driven programming
• Intro to threads and/or asynchronous event handling
• Designing engaging interactive systems, games, etc.
• IFTTT concepts and bootstrapping
• basic server-client models, browser extensions, Web APIs
• real-time networking

The course consists of two 90 minute lectures and weekly 90 minute laboratory sessions. The laboratory sessions form an integral part of the course and may cover required material that is not covered in lectures.

This is a second course in the interdisciplinary area of practice of New Media; it is not a survey course. As such, the emphasis is on the development of a theoretical conceptual foundation and the acquisition of the intellectual and practical skills required for further courses in the Digital Media program, and thus is intended for prospective majors in this program. It is not intended for those who seek a quick exposure to Digital Media, Digital Media applications or programming.

COURSE LEARNING OBJECTIVES

CLO1: Conduct meta-design (design a system to design things).

CLO2: Integrate computational techniques for content generation (or filtering) in a social media context. Differentiate and appraise the aesthetic of systems for generating public performances.

CLO3: Differentiate and appraise the aesthetics, design, and concept of systems that support collaboration and emergent creative behaviour. Implement fundamental data structures to design an interface, balancing constraints and incentives for participation.

CLO4: Review protocols for website structure and display. Identify and creatively experiment with Internet browser functionality and APIs.

CLO5: Apply generative design principles to the design of 3D form. Discuss form in relation to the contexts of the body, society, or the environment.

CLO6: Develop, design, and execute a creative intervention at a specific site.

TEXTBOOKS

(Syllabus will be updated during Week 1 and students are encouraged to monitor the EECS 1720 course webpage for ongoing lecture/reading materials/updates)

As of Jan 9, 2022 there are currently NO required textbooks for this course.
All necessary materials, notes and online resources will be provided (as needed)

Other Texts/Reference Materials:

Levin, Golan, and Tega Brain. *Code as Creative Medium: A Handbook for Computational Art and Design.* MIT Press, 2021.

Shiffman, Daniel. *Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction.* 2nd ed., Morgan Kaufmann, 2015.

Shiffman, Daniel. *The Nature of Code: Simulating Natural Systems with Processing.* 2012. https://natureofcode.com

Gonzalez Vivo, Patricio, and Jen Lowe. *The Book of Shaders.* 2015. https://thebookofshaders.com/

Marino, Mark C. *Critical Code Studies.* MIT Press, 2020.

Sack, Warren. *The Software Arts.* MIT Press, 2019.

Benjamin, Ruha. *Race After Technology: Abolitionist Codes for the New Jim Code*. Polity Press, 2019.

Moser, Mary Anne (ed.) and MacLeod, Douglas (ed.). *Immersed in Technology: Art and Virtual Environments.* MIT Press, 1996.

Boden, Margaret A. and Edmonds, Ernest A.. *From Fingers to Digits: An Artificial Aesthetic.* MIT Press, 2019.

The MIT Press series: Whitechapel: Documents of Contemporary Art
Time, Moving Image, Practice, Craft, Participation… many others!
https://mitpress.mit.edu/books/series/whitechapel-documents-contemporary-art

COURSE SCHEDULE

Week	Topics	Activity	Due
W1 - Jan 10	Course Introduction; P5.js and processing.py	[Lab 0 - setup Github & dl processing]	
W2 - Jan 17	IDEs, User Interface, UI Elements; JSON files, CLI, version control; intro to JS debug	**Intro to Lab 1** (browser lens - JS)	
W3 - Jan 24	JS OOP; *Quiz 1 details*	**Quiz 1** on Jan 27	
W4 - Jan 31	Python env/IDEs, setup; JSON files; *Group Project Phase 1 details*	Group Project lab time Feb 2	Individual Lab Project 1 (10%) due Feb 2
W5 - Feb 7	Python OOP; *Quiz 2 details;*	**Intro to Lab 2** (social art bot - python)	
W6 - Feb 14	server-client setup (JS and Python); *Group Project Phase 2 details*	**Quiz 2** on Feb 17	*GROUP PROJECT: P1 (5%)* due Feb 14
-	WINTER READING WEEK		Individual Lab Project 2 (10%) due Feb 23
W7 - Feb 28	Refresh Group project details; event driven programming; debug, real-time screen logs;	Group Project lab time Mar 2	
W8 - Mar 7	API integrations camera, audio, other?; (threads/async?); *Quiz 3 details*	**Intro to Lab 3** (multi-user environment)	
W9 - Mar 14	integrating multi-code / external sources; *Group Project Phase 3 details*	**Quiz 3** on Mar 17	*GROUP PROJECT: P2 (10%)* due Mar 14
W10 - Mar 21	multi-OS/platform apps - desktop clients;	**Intro to Lab 4** (collective co-creation)	Individual Lab Project 3 (10%) due Mar 23
W11 - Mar 28	bootstrapping; real-time networking; *Quiz 4 details*		
W12 - Apr 4	Gallery/ exhibition details plan and course summary	Group Project lab time Apr 6 **Quiz 4** on Apr 7	Individual Lab Project 4 (10%) due Apr 6
-	CLASSES END / EXAMS		*GROUP PROJECT: P3 (15%)* due Apr 14

Assessment	Weight	Due
Daily GitHub Update	10%	100 days of code (ABC - Always Be Coding)
Quizzes (4 @ 5%)	20%	Every 6th lecture (Thursdays ~3-4pm+)
Group Project	**30%**	Feb 14 (5%), **Mar 14 (10%), Apr 14 (15%)**
Individual Lab Projects	**40%**	**Before Lab on days: Feb 2, Feb 23, Mar 23, Apr 6**

COURSE EVALUATION

There are 109 days from and including Lecture 01 on Jan 11, 2022 up to and including the last day of Exams, Apr 29, 2022. Commit to coding ~1hour/day for up to 10% of your final grade. Students can participate in https://www.100daysofcode.com/ if they wish but course requirements will consist of GitHub commits verified by either the instructor or a designated TA.

Every 6th lecture there will be an in-class Quiz. These will occur near the end of the lecture where students may, if required or desired, remain past the 4:00pm course time. If alternative accommodations are required - let the instructor know ASAP. Format will most likely follow a "what is wrong with this code" example from recently explored material where students will document their debugging and thought processes. Alternatively, we might look at implementations in different languages… or artistic extensions…

Lab Exercises are graded Pass/Fail and are required first steps to be submitted along with each of the Individual Lab Projects. Final submissions of Individual Lab Projects are scored 50% for technical proficiency (considering code correctness, legibility, and stylistic consistency), and 50% for aesthetic experimentation (considering scope, ambition, and complexity). Generally, there will be the expectation of documentation (video, screen shot, short artist's intent etc.) in addition to a (working!) example submitted to GitHub.

The Group Project is divided into three phases to support and facilitate consistent project development and contribution practice. Phase 1 is a brief document of the intended framework, concept and development ideas, team member information etc. We will go over this in class. Phase 2 will include group members' working prototypes or segments indicating demonstratable competencies. Phase 3 is the integrated final form. Preference for projects ready to be exhibited but the instructor and/or TAs may provide requested assistance (external to graded course submission) to ready the project for exhibition if possible/required.

The final grade is obtained by adding the scores of the daily coding challenge, labs, quizzes, and projects and converting this score to a letter grade using the table below:

Score	Grade
≥ 90	A+
≥ 80	A
≥ 75	B+
≥ 70	B
≥ 65	C+
≥ 60	C
≥ 55	D+
≥ 50	D
≥ 40	E
< 40	F

ASSIGNMENT LIST

Adapted from *Code as Creative Medium*, by Golan Levin and Tega Brain. General descriptions are provided. Lab sessions will explore each objective with additional computational/technical expectations and artistic/aesthetic contexts.

Lab Project 1. Lens for the Internet - final submission due Week 4 - Feb 2

Lab Exercise. (completed during Week 2 & 3 lab) - *To be expanded upon during LAB*

Demonstrate sufficient aesthetic contemplation during lab discussion. GitHub commit showing repo handling for Lab submissions. Basic HTML, CSS manipulation via console and code.

Final Submission. (due before Week 4 lab)

A browser extension is a software add-on that alters the behavior of a web browser application. It can serve as a jumping-off point for creative intervention in the online realm. Extensions can change the appearance of specific online content, add additional information layers, redirect a viewer to different URLs, or change browser behaviors. Popular extensions serve to block ads, obscure the user's identity, circumvent censorship, fact-check politicians, and provide dictionary definitions. In this assignment, you are asked to design and build a browser extension that alters the appearance of (a part of) the Internet, or that augments, defamiliarizes, or estranges a viewer's browsing experience in a poetic or critical way. Publish your extension to a public platform, such as the Chrome Web Store or the Firefox Add-ons site.

Lab Project 2. Autonomous artistic agent - final submission due "RW" - Feb 23

Lab Exercise. (completed during Week 5 & 6 lab) - *To be expanded upon during LAB*

Identify project plan, language(s), and conceptual/draft aesthetic choices. GitHub commit indicating proficiency in obtaining content feed and pushing to content feed. Indicate proficiency in critical code and conscious software development.

Final Submission. (due before Week 6 ends - or you can submit during RW by Feb 23)

Create an autonomous software agent, or "bot," that generates posts to an online social media platform at regular intervals. Your bot might generate dialogue, stories, recipes, lies, witty quips, or poems, or it might publish wholly non-textual media such as images, sounds, melodies, comic strips, or animated GIFs. Your project may be a publishing platform, intermittently sharing content to an audience of subscribers, or it may operate as a social actor, interacting directly with other users. It might explore a particular theme, perform a role, communicate an emotional disposition, or promote a specific agenda. Your bot could also work as a filter, by aggregating, republishing, or reinterpreting content from other sources. Explore the different interactions afforded by the API of your chosen platform. The key is that your machine must publicly share its media online, and it must be orchestrated through code. Some important ground rules apply. Your program may not perform illegal actions. Your program should not spread hate speech (whether purposefully or accidentally), harass people, or make threats. It is wise for your bot to identify itself as an automated process. If you wish your program to interact with real individuals, those persons must first "opt-in" by following your bot. If you disobey this restriction, your project is likely to be short-lived; you risk having your account blocked or terminated very quickly.

Lab Project 3. Interrogating "togetherness" - final submission due Week 10 - Mar 23

Lab Exercise. (completed during Week 8 & 9 lab) - *To be expanded upon during LAB*

Demonstrate sufficient aesthetic contemplation during lab discussion. GitHub commit identifying project plan, async/sync, and interactant expectations. GitHub commit of sample multi-user server-client setup.

Final Submission. (due before Week 10 lab)

Design a multi-user environment that allows people in different locations to communicate with each other in a new way. Your system could facilitate language-based interactions like typing, speaking, or reading. Alternatively, it could convey non-verbal aspects of presence, such as gestures or breathing, to explore what Heidegger calls Dasein, or "being there together." Carefully consider the agency of participants in your system, and the timing and directionality of their messages. Are the users passive observers, listening to the murmurings of a crowd, or are they contributors to a grand conversation? Is communication asynchronous, wherein a user's traces are encountered by others later? Or is it synchronous, allowing for simultaneous participation in a live event? Is your system intended for one-to-one, one-to-many, many-to-one, or many-to-many?

Lab Project 4. Creative crowdsourcing - final submission due Week 12 - Apr 6

Lab Exercise. (completed during Week 10 & 11 lab) - *To be expanded upon during LAB*

Demonstrate sufficient aesthetic contemplation during lab discussion. GitHub commit identifying project plan, decisions of dynamically evolving content, and strategic conceptual framework for inducing creative behaviour. GitHub commit of sample multi-platform program.

Final Submission. (due before Week 12 lab)

Create an online, open system that invites visitors to collaborate on or contribute to a collectively produced media object. Your project should enable its participants to make changes that persist over time for others to experience (and potentially, modify). The result should be a dynamically evolving visual, textual, sonic, or physical artifact that develops from a novel interaction between friends, siblings, collaborators, neighbors, or strangers. Carefully consider the kinds of actions or authorship you hope to elicit, and how the interaction design of your system influences individual (and hence collective) behavior. Paradoxically, the tightest constraints often produce the most interesting results. Can you create the conditions for unexpected emergent behaviors to arise? The problem of "bootstrapping" sometimes arises in crowdsourced endeavors where it can be challenging to attract the first wave of participants, particularly if the system does not become interesting until there is significant participation. Does your project need an enlistment strategy?

GROUP PROJECT: Virtual Public Sculpture (*for Digital Media end-of-year Exhibition*)

Students will work collaboratively to produce an interactive art-work with the desired outcome of a public exhibition and will be developed in three phases over 10 weeks. It is expected that students will work together outside of class and lab hours however there will be three dedicated lab sessions (one per phase) prior to each submission deadline. General guidelines are provided and we will develop the concept further throughout Weeks 4-6. The Digital Media Exhibition often has a theme and we will explore this when it becomes known. Decisions on how to work collaboratively and how to assign tasks will be discussed in lecture.

Robert Smithson has remarked that "the site is a place where a piece should be but isn't." In this assignment, you are asked to create the missing piece for a site using augmented reality (AR). More specifically: place and view a virtual object of your choice, at a scale of your choice, in a physical location of your choice, with a programmatic behavior of your choice. When choosing your site, consider the conceptual and aesthetic opportunities offered by its location and history, as well as the ways in which it is occupied. Write down some observations about who uses the site, and how. Your location may be public, generic, or private. For example, it could be a prominent landmark, an unspecified supermarket aisle, your bedroom, or even the palm of your hand. Your virtual object may be appropriated, downloaded, recycled, modeled, or scanned. You might conceive of your object as a "sculpture," "monument," "installation," or "decoration." Or as something else entirely ("anomaly," "natural formation"). Write some code that makes it behave in a certain way. For example, it could rotate slowly in place, emit a shower of particles, or change size whenever the viewer gets close. Assume that your intervention will be viewed on a mobile device or tablet. Document your project in video, capturing both "over-the-shoulder" and "through-the-device" perspectives. Your documentation should convey how an audience would experience your artwork. How does your project change and reflect relationships between physical and virtual, public and private, screen and site? Publish your intervention, and its documentation, so that it can be shared with others.

Phase 1: Submit initial project concept - artistic & technical scope (5% — *due Feb 14)*
(Designated lab time during Week 4 - Feb 2)
Submission documents will be worked on in Week 4 lab. Lab Exercise will be a working demo of all lab sections contributing to one project in real time - a discussion on this and version control best practices - and set-up of each group's repo and each member's dev-branch. Aesthetic discussion in relation to code and critical reading.

Phase 2: Demo working prototype/segments/progress (10% — *due Mar 14)*
(Designated lab time during Week 7 - Mar 2)
Clarification of submission requirements for Phase 2 address in Week 7 lab; individual documentation and dev-branch GitHub commit. Group documentation for integration plan of all members' parts. Articulation of overall aesthetic concept. Aesthetic discussion in relation to code and critical reading.

Phase 3: Final exhibit-ready submission & documentation (15% — *due Apr 14)*
(Designated lab time during Week 12 - Apr 6)
Exhibition logistics, final project submission expectations and format, 'last-chance' questions.

COURSE POLICIES

Missed Quizzes: The student must notify their instructor as soon as is reasonably possible if the student misses a Quiz date. Accommodations will be provided for reasonable and approved requests.

Individual Exercises/Projects and Group Project: All exercises and projects will make use of content from both lectures and lab materials.

Contact: Discord, eClass and general course website will contain all course updates and critical information. In general - critical correspondence to students is emailed to the school addresses of students who are registered in the course. It is vital that you activate your school email account and check it regularly for announcements, corrections, and updates.

Land Acknowledgement

York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been taken care of by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many Indigenous Peoples from numerous First Nations, Métis, and Inuit communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject to the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

For more information, see The Indigenous Framework for York University: A Guide to Action.

Academic Honesty and Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. To this end, plagiarism will not be tolerated in this course.

All students must become familiar with the departmental policy on academic misconduct. All plagiarism incidents will be reported and penalized in accordance with the departmental and university policies. The minimum penalty is typically a 0 on the piece of work in question, up to and including receiving a failing grade in the course. Penalties can also include a transcript note, suspension, or expulsion from the university.

Following are only three examples of academic misconduct:
1. Plagiarism, the submission of work that is not one's own or for which other credit has been obtained. Types of plagiarism include:
   a. Downloading or buying research papers and submitting them as your own work.
   b. Copying and pasting portions of text from online journal articles or websites without proper citation.

      c. Copying someone else's work (a paper, lab report, formula, design, computer code, music, choreography, assignment, etc.) and submitting it as your own work.
2. Improper collaboration in group work if not expressly allowed
3. Copying or using unauthorized aids in tests and examinations

You must use York University standards when submitting your own work even if you were taught to document your sources differently in the past. There is an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with university life. Students are expected to review the Senate Policy on Academic Honesty and the Academic Integrity Tutorial.

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University. Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs. Additional information is available at the York Accessibility Hub.

Student Links

Student Rights and Responsibilities
Religious Observance
Academic Accommodation for Students with Disabilities
Counselling and Disability Services
York University Racism Policy and Procedures
York University's Policies on Sexual Violence
York University's Policies on Gender/LGBTQ*/Positive Space

Student Conduct

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class, according to the Senate Policy on Disruptive and/or Harassing Behaviour in Academic Situations.