Treepedia - MIT Senseable city lab

ARCH 510 : URBAN ANALYSIS AND SIMULATION

SCHEDULE:
Wednesdays: 6:00pm - 9:00pm
E-Classroom

INSTRUCTOR:
Cam Parkin - *jcparkin@uwaterloo.ca*

TERRITORIAL ACKNOWLEDGMENT:
We acknowledge that the School of Architecture is located on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. The University is situated on the Haldimand Tract, the land promised to the Six Nations that includes 10 kilometres on each side of the Grand River. (see references *here*)

COURSE DESCRIPTION:

The urban realm is a complex territory. In urban realms, we are often forces to ask ourselves what our priorities are, a question that become more and more relevant as populations move to urban centers, and our understanding of the role cities play in broader contexts grows. With competing agendas, budding ideas, and critical decisions all at play, designers are turning to data, analysis, and simulation to make more informed decisions and test new ideas. With the proliferation of BIM, big data, and out of the box analysis tools, this approach becomes more accessible, but we must ask ourselves how this data can be incorporated into the design process in a way that not only provides additional insight and opportunity, but also aligns with the designer's motives and goals, and the publics' best interests.

This course will introduce students to tools, methodologies, and concepts that will allow them to pursue analysis informed investigations of topics of interest relating to the expanded urban realm. The course will begin at a broader scale looking at regional data driven mapping using GIS, before moving towards site-finding exercises and scenario testing using simulation, analysis, and optimization in a grasshopper environment.

OBJECTIVES:

Concepts:
- Application of analysis and simulation to investigate urban issues
- Alignment of data and methodology with design goals
- Parametrically driven site-finding and scenario testing

Technical Skills:
- GIS mappping and analysis
- Grasshopper fundamentals
- Grasshopper-based simulation tools
- Introductory evolutionary solvers

Soft skills:
- Metacognition and autodidacticism
- Computational thinking
- Digital file organization, hygiene, and habits
- Translation of concepts and techniques between different design problems

STRUCTURE:

Lectures/Assignment Intros (In person, MS Teams recorded, synchronous): Most class will begin with a lecture or introduction to discuss the concepts that will be covered and outline any assignments. This will be an important touch point to make sure everyone is on the same page regarding key concepts, approaches and expectations.

Tutorials (In person or pre-recorded, MS Teams recorded, synchronous & asynchronous): During tutorials we will cover specific software and techniques. Tutorials will be either live and recorded, or will be prerecorded so that students can go through them at their own pace. General questions and clarifications can be addressed during this time, or in the support channel or worksessions.

Worksessions (In person): Worksessions will act as a chance for students to share progress on their assignments and get feedback and troubleshooting advice. Time not spend in small working groups with the teaching team should be spent working on assignments.

ASSIGNMENTS:

Progress logs - 5% * 6 = 30% (completion)
Due @ 6 pm the following Wednesday

A01: Analytical Map Set - 30% (assessed)
Due @ 10pm on October 18

A02: Intelligent boxes - 25% (assessed)
Due @ 10pm on November 22

Reflection - 10% (assessed)
Due @ 10pm on December 2

Participation - 5%
Evaluated based on contribution to support channel, class discussions, and the virtual pin up space

Note: detailed project briefs will be circulated upon commencement

EVALUATION:

Completion grading scheme:

- Completion of all required deliverables: 4/5
- Any missing/incomplete/illegible deliverables will result in reductions
- Students completing optional deliverables and/or including their own additional experimentation will receive 5/5
- All deliverables including additional explorations should be labeled clearly for grading
- Completion must be handed in on time or they will receive a 0. The 5% late policy does not apply to labs.

Assessed grading scheme:

Individual grading breakdowns will be included in assignment handouts, however, considerations will always include:

- Completion of the deliverables
- Organization and clarity of the submission
- Consideration of the themes covered in the lecture
- Independent inquiry, exploration and development

Grades will be assigned based on the following standard:

0% - 49%   Works fails to meet any expectations
50% - 69%   Significant portions are missing and/or below expectations
70% - 74%   All or most deliverables are met, with portions below the expected level of quality
75% - 79%   All deliverables are met and the level of work is in line with expectations
80% - 89%   All deliverables are met and portions of the work are beyond expectations
90% - 100%   Exemplary work with all facets exceeding expectations

The passing grade for this course is 50%.

COURSE DELIVERY PLATFORMS & COMMUNICATION:
During in-person learning, we will be using additional platforms to record and supplement in-class actives. Here is a breakdown of tools we will use in this course:

Teams:
- Recorded lectures and tutorials
- Course documents (assignments, etc.)
- Messaging for informal chats and questions
- Document sharing, sign up sheets, etc.

Learn:
- Assignment submissions
- Grades

Email:
- Formal announcements and communications

Miro:
- Progress log submissions
- Virtual pin up space

SOFTWARE:
Required:
QGIS
Rhino
Various Grasshopper Plugins

SUBMISSIONS:
All assignments will be submitted on Learn. When possible, please combine files into a single PDF. Large PDFs should be compressed using Acrobat Pro or smallpdf.com. Logs will be graded from Miro. A snapshot of the Miro board will be taken to record progress at the submission date.

Late Submissions:
Assignments that are handed in late will receive an initial penalty of 5% on the first calendar day late and a 5% penalty per calendar day thereafter. After 5 calendar days, the assignment will receive a 0%. Please note that if there is a class-wide issue regarding a deadline, it should be communicated to the instructor. Logs are not subject to the 5% penalty, and will receive a 0 if no material is present at the deadline.

This course relies heavily on technology to complete assignments. Students are expected to work responsibly and carefully so that they can submit assignments on time. Issues such as forgetting to save before a crash or not leaving time for digital processes will not be accepted as reasoning for a late assignment. If students do run into technical issues that hinder a submission, please upload everything you have on time and explain the issue in the submission.

Late Policy:
Students are allocated one late pass for the term. This allows students to make one submission up to **24** hours after the stated deadline without penalty and without any request for accommodation.

Students are required to communicate with your instructor their intention to use a late pass before the relevant deadline. If the pass is used by group, it will count as each student in the group using their pass.

Outside of the late pass, only in the case of a justified medical or personal reason will these penalties be waived, and only if these have been officially submitted to the Undergraduate Student Services Co-Ordinator *(archundergradoffice@uwaterloo.ca)* and accepted by the Undergraduate Office.

Students seeking accommodations due to COVID-19, are to follow Covid-19-related accommodations as outlined by the university *here*.

CULTURE AND GROUP WORK:
This course is designed so that students get more out when they put more in. Curiosity, coming prepared with material, an openness to new technologies and processes, and a commitment to purposeful and ambitious investigation will all lead to success.

Whether assignments are submitted as groups or individuals, the culture of the course will involve plenty of collaboration between students to encourage sharing knowledge, and promote constructive teamwork. You (and the Internet) should also always be each other's first resource, before seeking the instructor. By solving problems in groups, you will learn more, and have more meaningful time with the instructor. For projects that involve group work, team members are expected to contribute equally, and will all receive the same grade. If there are concerns regarding a member pulling their weight, please reach out to the course instructor and solution will be discussed.

DIGITAL SUPPORT:
When asking for support regarding digital files, please follow these guidelines:
- Include the file(s) in question or a link to download it if it is too large
- Describe the steps you have taken to resolve the issues so far
- Include images and/or notes of what you are trying to achieve

RESOURCES:
QGIS resources: https://www.qgis.org/en/site/forusers/trainingmaterial/index.html
QGIS training: https://docs.qgis.org/3.22/en/docs/training_manual/index.html
Rhino + Grasshopper plugins: https://www.food4rhino.com
Grasshopper components: https://rhino.github.io/
Grasshopper video tutorials: https://vimeopro.com/rhino/grasshopper-getting-started-by-david-rutten/video/79842791
Grasshopper manual: http://www.liftarchitects.com/blog/2009/3/25/grasshopper-primer-english-edition

COVID-19 SPECIAL STATEMENT
Given the on-going situation around COVID-19, students are to refer to the University of Waterloo's developing *information resource page* for up-to-date information on academic updates, health services, important dates, co-op, accommodation rules and other university level responses to COVID-19.

FAIR CONTINGENCIES FOR EMERGENCY REMOTE TEACHING
To provide contingency for unforeseen circumstances, the instructor reserves the right to modify course topics and/or assessments and/or weight and/or deadlines with due and fair notice to students. In the event of such challenges, the instructor will work with the Department/Faculty to find reasonable and fair solutions that respect rights and workloads of students, staff, and faculty.

MENTAL HEALTH SUPPORT
All of us need a support system. We encourage you to seek out mental health supports when they are needed. Please reach out to *Campus Wellness* and *Counselling Services*.

We understand that these circumstances can be troubling, and you may need to speak with someone for emotional support. *Good2Talk* is a post-secondary student helpline based in Ontario, Canada that is available to all students.

EQUITY, DIVERSITY AND INCLUSION COMMITMENT
The School of Architecture is committed to foster and support equity, diversity and inclusion. If you experience discrimination, micro-aggression, or other forms of racism, sexism, discrimination against 2SLGBTQ+, or disability, there are several pathways available for addressing this:

A) If you feel comfortable bringing this up directly with the faculty, staff or student who has said or done something offensive, we invite you, or a friend, to speak directly with this person. People make mistakes and dealing them directly in the present may be the most effective means of addressing the issue.

B) You can reach out to either the Undergraduate office *(archundergradoffice@uwaterloo.ca)*, Graduate office *(archgradoffice@uwaterloo.ca)*, or Director *(mmprzybylski@uwaterloo.ca)*. If you contact any of these people in confidence, they are bound to preserve your anonymity and follow up on your report.

C) You can choose to report centrally to the Equity Office. The Equity Office can be reached by emailing equity@uwaterloo.ca. More information on the functions and services of the equity office can be found *here*.

D) *Racial Advocacy for Inclusion, Solidarity and Equity (RAISE)* is a student-led Waterloo Undergraduate Student Association (WUSA) service launching in the Winter 2019 term. RAISE serves to address racism and xenophobia on the University of Waterloo campus with initiatives reflective of RAISE's three pillars of Education and Advocacy, Peer-to-Peer Support, and Community Building. The initiatives include but are not limited to: formal means to report and confront racism, accessible and considerate peer-support, and organization of social events to cultivate both an uplifting and united community. You can report an incident using their *online form*.

CACB STUDENT PERFORMANCE CRITERIA
The BAS/MArch program enables students to achieve the accreditation standards set by the Canadian Architectural Certification Board as described at *https://cacb.ca/wp-content/uploads/2021/08/ConditionsAndTerms.pdf* . This course addresses the CACB criteria and standards that are noted on the Accreditation page of the School of Architecture website *(https://uwaterloo.ca/architecture/about-waterloo-architecture/accreditation-information#:~:text=The%20program%20in%20Architecture%20at,Board%20(CACB)%20in%202017.)*.

ACADEMIC INTEGRITY, GRIEVANCE, DISCIPLINE, APPEALS AND NOTE FOR STUDENTS WITH DISABILITIES:

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the *Office of Academic Integrity* for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read *Policy 70, Student Petitions and Grievances, Section 4*. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the *Office of Academic Integrity* for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to *Policy 71, Student Discipline*. For typical penalties, check Guidelines for the *Assessment of Penalties*.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: *AccessAbility Services*, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.

Week	Date	Unit	Lecture	Tutorial	Activity	Assigned	Due	Work on (3hrs)
W01	07-Sep	Unit 1: Regional Mapping and Analysis	Course Intro			A01, Log01		Select topic, location
W02	14-Sep		Data	GIS intro & Data Collection		Log02	Log01 (Wed 6pm)	Set up base map and gather data
W03	21-Sep		Analysis	Analysis Pt 1& Exports		Log03	Log02 (Wed 6pm)	Plottings, test graphics
W04	28-Sep			Analysis Pt 2 & GH Refresh			Log03 (Wed 6pm)	Test analysis
W05	05-Oct				Work session			Work on A01
		Break						
W06	19-Oct	Transition	A02 Intro		Presentations & Discussion	A02	**A01** (Tues 10pm)	
W07	26-Oct			GH Analysis I	Presentations & Discussion	Log04		Grasshopper exercise
W08	02-Nov	Unit 2: 3D Intervention Simulation and Analysis	Massing Analysis	GH Analysis II		Log05	Log04 (Wed 6pm)	Test analysis plug ins
W09	09-Nov		Artificial Intelligence	Evolutionary Solver		Log06	Log05 (Wed 6pm)	Apply evolutionary solver to script
W10	16-Nov				Work session	Reflection	Log06 (Wed 6pm)	Work on A02
W11	23-Nov				Presentations & Discussion		**A02** (Tues 10pm)	Reflection
W12	30-Nov				Presentations & Discussion		**Reflection** (Friday 10pm)	Reflection

*Content is subject to change