UNIVERSITY OF CALGARY
SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE

Winter 2023

Course Number	ARCH 680.19 L04	**Classroom**	PF 3177
Course Name	Materialising with Machinic Agency		
Pre/Co-Requisites			
Instructor	Dr Alicia Nahmad Vazquez	**Office Hours/Location**	By appointment physical (office PF 4th floor) & digital (zoom, and other communication platforms introduced during the course)
	Email: alicia.nahmadvazquez@ucalgary.ca		**Phone:**
Class Dates	**Mandatory in person both in the classroom and the robotics lab in the PF building** synchronous zoom meetings (TBD) Thursdays, 09:00 am to 12:00 pm Jan 12th – April 6th. Thursdays will be in person at the robotic lab in PF, unless otherwise agreed (hybrid digital / physical format) Additional meetings in Thursday afternoon with our project partners will be scheduled with the students (2 in total). Additional time to use the robots will be scheduled according to students, Machine and TAs availability an reviewed weekly as needed		
Instructor Email Policy	Please note that all course communications must occur through your @ucalgary email, and I will respond to emails sent via student's @ucalgary emails within 48 hours. The course will also heavily use platforms for discussion, sharing information and perspectives including but not limited to D2L		
Name and Email of Teaching Assistant(s)	Arman Khalil		

Course Description

"… the machine is a marvellous simplifier; the emancipator of the creative mind, and in time the regenerator of the creative conscience"

Frank Lloyd Wright

AIMS & RATIONALE

Materialising with machinic agency is an elective organised thematically under three main research topics: materials, machines and interactions. The elective will focus on developing

critical design thinking towards the processes and meanings of design, capturing and making through a hands-on approach in which the emphasis is placed on all aspects of the relationship between virtual and physical data. The elective will explore **lines & robots** as means to interlink virtual and physical through the use of robotic, material and scanning technologies. A reconfigurable kit of parts of furniture for Retrofitting and accessibility will be the final outputs.

The current era of architectural design has been characterised by the proliferation of digital design tools and machines. While they cannot be the main drivers of the architectural project, they represent a new approach to design thinking and making. By actively testing these novel modes of design generation and physical production through focused acts of doing, collecting and making, materialising with machinic agency present students a range of opportunities to develop individual methods of practice and to hone their use of digital tools for design enquiry.

Materialising with machinic agency does not pretend to be a technical instruction manual to design and fabricate with robots but a course that looks beyond digital design and fabrication tools as simple automation and embraces them as tools that enable architectural creativity as a manner of design thinking whilst still responding to complex spatial and material constraints.

An approach of digital technology and digital fabrication as means towards a more sustainable and inclusive future is taken, as such the elective will work closely with the Hockey Sledge Association and Calgary Community Skating Rinks.

COMPOSITION

Materialising with machinic agency will be delivered in-3 hour weekly sessions during 10 weeks as per the course timetable. The class, although a single long module, the hours will be divided into short project introductions and lectures, software demonstrations, technical tutorials supplemented by seminars, and in-depth hands-on physical and digital prototyping sessions.

Each module will end with a review that allows to move the project forward into the next stage. The course will be structured as a collaborative team-based experiment and each block will consist of digital and physical explorations.

Additionally, we will be meeting our industry and community partners (hockey sledge players) for feedback and project discussion as well as for the final prototypes.

The course is divided in modules as follows:

The first three-week block of the module “Modelling for Digital Fabrication” will introduce students to parametric design and modelling techniques that consider material and machine behaviour and will ask them to reflect the relationship of the parts to the whole within a digital and a physical model. They will model and design a furniture system based on parts

and their combinatorial space considering material and fabrication constrains and parameters.

The second four-week intensive block of teaching, “Machinic Agencies”, will introduce student to the fundamentals of how robots operate and geometric constraints and operations that are used to define their motion and how to better use them for their design. Students will learn different ways to create robot paths and code to fabricate their furniture models. They will then explore design, machine and material constraints and learn how to calibrate and control them. The second block will seek to understand the impact of machinic simulations in design and how incorporating machinic constraints from early stages of the design. Students will produce models of their furniture through robotic hot-wire cutting (RHWC)

The final three-week intensive block of teaching, “Data Collecion”, will introduce students to data collection and point cloud manipulation techniques. Based on the scanned geometries, students will adjust their digital design and fabrication system. During these four weeks explorations will be focused on exploring scanning as means to retrieve architectural data, cleaning it to extract main features, analysis and validation as new input for secondary machinic processes. A new set of robotic coordinates and paths will have to be created considering a different kind of end effector that can print on a 3D object (vs traditionally 3D printing built on 2D surfaces).

Finally, students are expected to prototype their furniture kit of parts for discussion and testing.

Students can meet weekly with the instructor as needed during office hours. Teaching throughout the module will be based on learning through student exploration, rather than didactic delivery.

The projects will be underpinned by the following study methods:

- Use of **advanced 3D modelling tools**: to explore design options in a controlled way and the material and machine parameters that influence their formation. These tools will be used as creative responses to design problems and simulate the performance of the material and the machine. Software include Autodesl Maya, Rhino, Grasshopper, processing and ABB Robot Studio

- Use of **industrial robotic manipulators**: to investigate creative responses to design problems and explore their versatility whilst understanding the constraints that different end-effectors and materials place on the generation of robotic paths and code. Specific parameters will need to be considered for each process, their machine and material behaviours and how to incorporate them into the design process. Industrial robotic arms are incredible flexible machines that offer an array of possibilities for architects to explore various digital fabrication process using the same machine by simply changing the end effector. During this course we will explore **three digital fabrication processes enabled by the robot through three custom made end effector**: hot-wire cutting

- Use of **scanning and data collection technologies**: to understand processes that work with large amounts of data such as point clouds. This dense data conveys information from the physical world which can be used as feedback for further design decisions and processes. can include additional information such as colour that can then be used to inform design decisions. Point clouds can also be converted into a mesh, but due to the feedback and secondary robotic process it would be possible to explore working with point-clouds directly. Python and ROS will be used with a lidar 3D scanned mounted on a UniTree robot.

- Use of online tutorials and resources: for self-directed learning.

Course Hours: 3 units

Online Delivery (If applicable)

The class will be delivered mainly in a physical format with a potential of a hybrid digital/physical lectures for the technical parts of the class. However, due to the nature of working with robot arms physical presence is expected during the robot sessions.
The 3 hours session is divided as follows

Thursday – robot session (1.5hours) will be synchronous in real life and physical at the lab, students are expected to use the robots for the different processes. They are expected to bring their files, code and materials prepared for lab activities. Students that are not directly interacting with the robots will use the class time to prepare their code and files with direct input from the instructor and the TA's. All students are required to be present as per the course timetable and location.

Thursday - digital tutorials(1.5 hours) will focus on the digital aspects of the class related to 3D modelling, robot code preparation, IK solvers, scanning devices and general rationale behind the process. The digital sessions will be monitored and delivered in a physical or digital format according to how things progress. Students will be required to participate synchronously in zoom sessions if the class goes digital or to be physically present in the classroom as per the class timetable and location.

Additional material, readings and tutorials will be updated in **D2L for students to read, consult and work asynchronously.**

Course submissions will be through D2L and physical presentations.

Students are expected to arrange for additional asynchronous sessions to use the robots to test and fabricate their prototypes. These sessions should be arranged with the instructor and the TA in advance. Consider that the robot lab is used by different courses and last minute requests, specially near deadlines might not be possible to accommodate. Hence preparation and planning for prototyping is critical.

Don’t expect things to work the first time you do them. Several testing and prototyping sessions are required to refine workflows.

If unable to participate live due to unforeseen circumstances, inform the instructor in advance to work out an alternative participation activity.

COVID 19
As face to face activities continue to be disrupted due to the Coronavirus pandemic, the class will be continuously monitored. Access to the lab will be in teams of 2-3 people at the time. The physical sessions will be adjusted depending on how things develop in the university and the City.

You are expected to follow all university regulations when on campus (i.e. mask wearing, etc) As you know this are unprecedent times and the course will be continuously adjusted to reflect the circumstances. Access to the robotics lab both in the main campus and the CBDL building will be allowed according to university policies. Last year we also discovered valuable online resources that will continue to be used.

Course Learning Outcomes

Upon completion of this course, students will know and be able to:
The outcomes of the elective materialising with machinic agency can be broadly described as practical skills relating to design thinking, in relation to digital design and fabrication tools, materials and systems. Students will acquire knowledge on how robots work, how to problem solve, plan, set them up, design their end effectors and run them. Students will learn robot path planning with different end effector tools. This will allow them to understand the flexibility that robots offer and the specific intricacies of path planning and tool design.

The focus of the elective goes beyond the machinic processes and the emphasis is rather in how can the constraints and affordances of the machine can be directly applied to the design process. The aim is to develop a design to fabrication process in which the affordances of the geometry and of the machine are closely related.
The course will integrate a scanning step, to explore ways to introduce a feedback loop between physical and digital material and machine processes. After the scanning, 3D printing or other robotic processes can be acted on the geometry

Upon completion of the course you will be able to:
1. Work on teams,
2. Use digital and physical tools and technologies for digital design and robotic fabrication including different end effectors and material processes
3. Use and design feedback loops between the digital and the physical that can inform design as well as further digital fabrication processes.
4. Understand Data Collection techniques

5. Contextualize your work within the contemporary ecosystem of robotics in architecture.

The development of a modular furniture system and its combinatorial space which can allow for multiple configurations within a retrofitting project for accessibility will be used as testing ground for the above techniques and technologies.

Learning Resources

- Pdf version of the required papers and articles will be provided in the course D2L site.
- Video tutorials will be provided in D2L. However, **they do not substitute** the lectures. The videos are an additional valuable resource to enhance the learning experience.
- Books can be consulted by the students though the library resources.
- Videos and self learning material are widely available online and students are expected to do their own research and use their discretion or consult with the tutor to find information for self-directed learning that can help them on the course.

RECOMMENDED READINGS

Austern, G. et al. 2018. Rationalization methods in computer aided fabrication: A critical review. Automation in Construction 90(March 2017), pp. 281–293. Available at: https://doi.org/10.1016/j.autcon.2017.12.027.

Feringa, J. 2014. Entrepeneurship in architectural robotics: The simultaneity of craft, economics and design. Architectural design: Made by robots , p. 63.

Kotnik, T. 2010. Digital Architectural Design as Exploration of Computable Functions. International Journal of Architectural Computing 8(1), pp. 1–16. doi: 10.1260/1478-0771.8.1.1.

Lloyd Wright, F. 1901. The Art and Craft of the Machine. Brush and Pencil 8(2), pp. 77–81, 83-85,87-90. Available at: http://www.jstor.org/stable/25505640.

McCullough, M. 1997. Chapter 7 Medium. In: Abstracting Craft: The practiced digital hand. Cambridge, Massachusets: MIT Press

McCullough, M. [no date]. Chapter 1 Tools. In: Abstracting Craft: The practiced digital hand., pp. 59–81.

Picon, A. 2004. Architecture and the Virtual: Towards a New Materiality. PRAXIS: Journal of Writing + Building 6, pp. 114–121.

Picon, A. 2014. Robots and Architecture: Experiments, Fiction, Epistemology. Architectual Design: Made by robots , pp. 54–59.

Sakarovitch, J. 2003. Stereotomy, a multifaceted technique. Proceedings of the First International Congress on Construction History, Madrid, January 2003 (January), pp. 69–79. Available at: http://dialnet.unirioja.es/servlet/articulo?codigo=4175162&orden=387446&info=link.

Schnapp, J. 2004. Grey Room, Inc. and the Massachusetts Institute of Technology. Grey Room 23(18), pp. 5–25.

RECOMMENDED VIDEOS

Frames of reference
https://www.youtube.com/watch?v=pyBNImQkRuk&t=12s
DH Parameters
https://www.youtube.com/watch?v=rA9tm0gTln8

BOOKS /JOURNALS

5. The Robotic Touch: How Robots Change Architecture, Kohler et al, Park Books 2015
6. AD Made by Robots: Challenging Architecture at a Larger Scale:229
7. Log No. 36 (Robolog, Winter 2016) published by JStor
8. The function of Form, Farshid Moussavi et al, ACTAR
9. ROBIARCH conference proceedings 2012, 2014, 2016, 2018. Published by Springer

Technology requirements (D2L etc.):

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- The following software: Autodesk Maya 2020, Rhino 7, grasshopper, ABB robot studio , processing.
- A current and updated web browser;
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Broadband internet connection
- Student IT Resources

Most current laptops will have a built-in webcam, speaker and microphone.

Workshop Safety Training Requirement
If a course requires the use of the SAPL workshop, students must complete all online University of Calgary safety courses, the online Trajectory safety training course, as well as in-person workshop training and a grade of pass on the final evaluation project, to be granted access to the SAPL workshop. This training is offered once a year, around the start of the Fall term and has a completion deadline.

Additional Classroom Conduct and Related Information

Guidelines for Zoom Sessions in Online Classes

Students are expected to participate actively in all Zoom sessions and to turn on their webcam. Please join our class in a quiet space that will allow you to be fully present and engaged in the Zoom sessions. Students must behave in a professional manner during the session. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

Assessment Components

Assessment Method	Description	Weight	Aligned Course Learning Outcome
Design Prototype	Final design pieces based on the results of variation on the configuration of the line as well as explorations of ornamentation based on the fabrication process and constraints.	35%	1 to 5
Lines & Robots Catalogue	Layout of graphic material, digital and physical prototypes documenting the parametric model setup and the design and fabrication exploration space. The document should be clearly organised and structured and describe all aspects of the furniture &	55%	1 to 5

	ornament design process. Each of the groups will design and fabricate a family of experimental studies. All prototypes digital and physical models are to be catalogued, documented and submitted as a bound folio accompanied by a digital copy.		
Participation & Coherency	A portion of your mark will be derived from assessments of your participation in class discussions, d2L quizzes and the overall coherency of the work. Feedback will be given during the course.	10%	1 to 5

Assessment and Evaluation Information

Attendance and Participation Expectations:

Students are expected to attend all classes and participate in the discussions. They should come prepared to the class with geometry and robot paths for discussion.

The TA on this course if to help guide you through the assignments, help you understand and prepare your code and robot paths and modeling questions. The TA is **NOT here to make your robot paths for you, fix your code or prepare your raw material**.

THE CLASS IS NOT A SHOP WHERE YOU DROP GEOMETRY AND EXPECTED FINISHED PIECES THE NEXT DAY.

Programming robots requires an understanding of geometry constrains both on the robot motions and on the architectural pieces. The only way to learn how to do this is by doing it.

Final pieces without a clear design and fabrication process and without class participation won't be considered successful.

Guidelines for Submitting Assignments:
Submission should follow the format provided by the instructor. Deviations from the format would result in point deductions.

A final pdf catalogue and a hot wire cut prototype is expected

Final Examinations:
The course will have a final presentation of the design prototypes and the design and fabrication process and a final document submission. An interim document will be graded to give the students an indication of their progress.

Expectations for Writing (https://www.ucalgary.ca/pubs/calendar/current/e-2.html):

Late Assignments:

Criteria that must be met to pass: The course is designed for collaborative / team work and both submissions (prototypes and catalogue) would be evaluated as such. **Individual submission or 'group projects' that lack coherence won't be admitted.**

Active participation during the class is expected. Reliance on the TA to produce the code or the robot pieces is not acceptable.

Grading Scale

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance

B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School. (https://www.ucalgary.ca/pubs/calendar/current/salp-3-3.html)

(for Architecture courses only) CACB Student Performance Criteria

The following CACB Student Performance Criteria will be covered in this course at a primary level (other criteria will be covered at a secondary level):

A2. Design Skills The student must demonstrate an ability to apply design theories, methods, and precedents to the conception, configuration, and design of buildings, spaces, building elements, and tectonic components.

A3. Design Tools The student must demonstrate an ability to use the broad range of design tools available to the architectural discipline, including a range of techniques for twodimensional and threedimensional representation, computational design, modeling, simulation, and fabrication.

A7. Detail Design The student must demonstrate an ability to assess, as an integral part of design, the appropriate combinations of materials, components, and assemblies in the development of detailed architectural elements through drawing, modeling, and/or fullscale prototypes.

A8. Design Documentation The student must demonstrate an ability to document and present the outcome of a design project using the broad range of architectural media, including documentation for the purposes of construction, drawings, and specifications.

D1. Comprehensive Design The student must demonstrate an ability to produce an architectural design based on a concept, a building program, and a site which broadly

integrates contextual factors, structural and environmental systems, building envelopes and assemblies, regulatory requirements, and environmental stewardship.

Topic Areas & Detailed Class Schedule

Include information relevant to the class schedule, such as weekly topics, readings, and assignment due dates. For online, remote or blended courses include whether course activities are synchronous (i.e., real-time/Zoom) and asynchronous (i.e., students complete on their own time such as discussion boards, watching videos, etc.). It is recommended that important dates including the first day of classes, holidays, term breaks and last day of classes also be included.

Course Schedule Date	Topic	Assignments/Due Dates
Examples below, please adjust to fit your course dates.		
Jan 9 – 13	Introduction, presentation of working method, software intro / Intro to form-free modelling and ruled surfaces	
Jan 16 - 20	Modelling for DigFab, robotic fabrication & documentation tecnhniques	Jan 19 meeting with community partners and hockey sledge association players
Jan 23 - 27	Modelling for DigFab	
Jan 30 – Feb 3	Machinic Agencies / Robotic Fundamentals /IK/FK/Frames/Rotations/Transformations	**Feb 2: Line design and explorations concept review (15)**
Feb 6 - 10	Robotic simulations and code generation / End Effectors design and fabrication HWC	
Feb 13 - 17	HWC	
Feb 19 -25	Term Break	
Monday Feb 20	Alberta Family Day Holiday	
Feb 27 – Mar 3	HWC	**Mar 2: Fabrication Prototypes review**
Mar 6 - 10	Scanning technologies, data retrieval and manipulation	**Prototypes review with community partners**
Mar 13 - 17	Winter Block Week	
Mar 20 - 24	Point clouds & Feedback loops / Ornament generation	
Mar 27 – 31	Ornament generation, kit of parts prototyping, finishing & deployment strategies	
Apr 3 - 6	Presentations & Submissions	Apr 5: Final presentation & deployment
Friday April 7	Good Friday	
Monday April 10	Easter Monday	
Apr 11 - 12		

Indicate the following dates:

- If applicable, dates, times and locations of all approved class activities scheduled outside of regular course hours

Guidelines for Zoom Sessions

If video conferencing tools such as Zoom or MS Teams will be used during course activities, provide information related to student learning and conduct, and indicate whether these sessions will be recorded.

Classes will be physical for the most part. If circumstances change and the classes move to zoom please see the following:

Zoom is a video conferencing program that will allow us to meet at specific times for a "live" video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith, and respect (as per the Code of Conduct). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behaviour in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g Student Non-Academic Misconduct Policy). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your zoom sessions visit: https://elearn.ucalgary.ca/guidelines-for-zoom/

If you are unable to attend a Zoom session, please contact your instructor in advance to arrange an alternative activity for the missed session (e.g., to review the recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for

students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

Special Budgetary Requirements

2 trips to a Calgary community in the NW (Parkdale) will be required
Finishing products for the foam will be explored during the course.

University of Calgary Policies and Supports

COVID-19 PROCEDURE FOR SICK STUDENTS: https://www.ucalgary.ca/risk/covid-19-procedure-for-sick-students

UNIVERSITY OF CALGARY COVID-19 UPDATES: https://www.ucalgary.ca/risk/emergency-management/covid-19-response

ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-policy

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure
Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their instructor (contact information on first page above).
SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/ .

ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit: https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf

https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf
Additional information is available on the Academic Integrity Website at https://ucalgary.ca/student-services/student-success/learning/academic-integrity.

COPYRIGHT LEGISLATION:
All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy (https://www.ucalgary.ca/pubs/calendar/current/k.html).

INSTRUCTOR INTELLECTUAL PROPERTY
Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY
Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

SEXUAL VIOLENCE POLICY
The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (https://www.ucalgary.ca/pubs/calendar/current/i-3.html) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at: https://www.ucalgary.ca/registrar/registration/course-outlines for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk