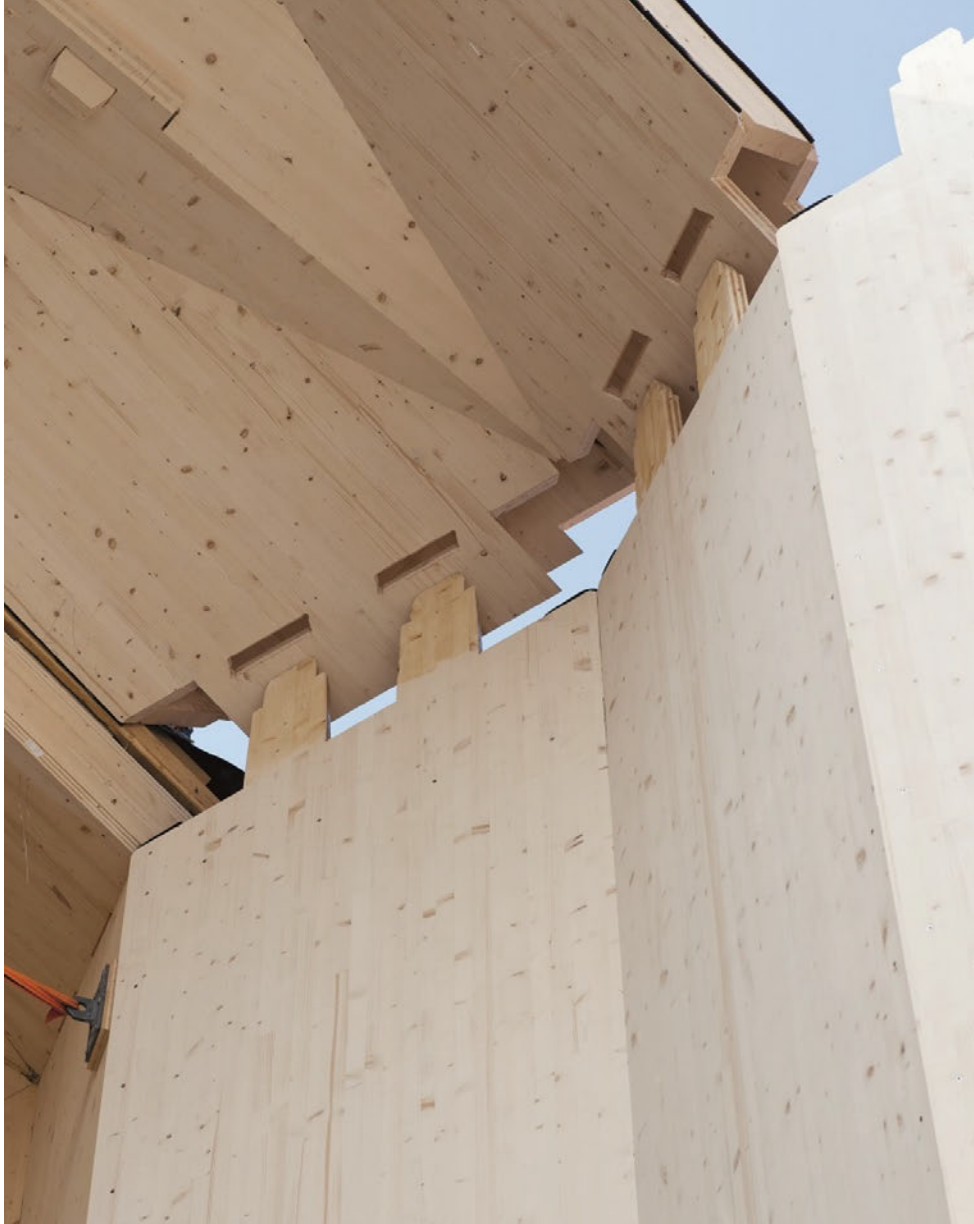




UNIVERSITY OF CALGARY
SCHOOL OF ARCHITECTURE,
PLANNING AND LANDSCAPE

Fall 2025



Vidy-Lausanne Theatre in Construction. Lausanne, Switzerland. Yves Weinand Architects, 2017.

DSGN 431:
INTRODUCTION TO BUILDING SCIENCE

Land Acknowledgement:

The University of Calgary, located in the heart of Southern Alberta, both acknowledges and pays tribute to the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).

The University of Calgary is situated on land Northwest of where the Bow River meets the Elbow River, a site traditionally known as Moh'kins'tsis to the Blackfoot, Wîchîspa to the Stoney Nakoda, and Guts'ists'i to the Tsuut'ina. On this land and in this place we strive to learn together, walk together, and grow together "in a good way."

Course Number: DSGN 431**Course Name:** Introduction to Building Science**Classroom:** [REDACTED]**Class Dates:** Thursdays, Sept 2 – Dec 5, 9:30am – 12:15pm**Coordinating Instructor:** Assistant Professor Chad Connery

- Email: chad.connery@ucalgary.ca
- Office Hours and Location: [REDACTED] / Zoom, by appointment, Mon/Thu 2:00pm - 3:00pm
- Instructor Email Policy: All course communications must occur through @ucalgary email or MS Teams and generally responded to within 36 hours outside of anomalous circumstance.

Teaching Assistant: Joel Patry

- Email: joel.patry@ucalgary.ca
- Office Hours and Location: by appointment via email
- Instructor Email Policy: All course communications must occur through @ucalgary email or MS Teams and generally responded to within 36 hours outside of anomalous circumstance.

Requisites: See [Section 3.3.5](#) of the Academic Calendar for more information regarding School of Architecture, Planning and Landscape courses.

- Prerequisite(s): DSGN 331 Admission to the Bachelor of Design in City Innovation program.
- Antirequisite(s): Credit for DSGN 431 and ARCH 508 will not be allowed.

Course Description:

Introduces key concepts in building science: functioning of building enclosure, the physical behaviour of building components under thermal/pressure stresses; the fundamentals of acoustics; building materials and their behaviour properties relative to climatic cycles.

- DSGN 431 is an introductory lecture and seminar course focused on the fundamental principles and practices of **materials**, **systems**, and **standards** in the built environment.
- Broadly, the course seeks to recognize that cities are, in part, technological aggregations of land moving energy from landscapes of extraction to landscapes of construction (and waste) through systematized techniques according to legal, environmental, and social standards.
- The course seeks a balance of topics and presented material between multiple design disciplines in the built environment, engaging urban landscapes with equal technical interest and rigor as build architectural form.
- Synchronous presentations, dialogue, and workshops are supported by asynchronous research, collaborations, and minor design work to demonstrate understanding and deepen diverse student interests within the broad focus of the course.
- Academic Calendar description: <https://calendar.ucalgary.ca/courses/1656211>
- Course Hours: 3 units (3-0)

Course Delivery:

- Class delivery is a mandatory in-person format with some exceptions discussed in class and with respect to developing circumstance.
- In cases where remote learning is required, a synchronous Zoom modality will be adopted.
- Desire2Learn (D2L) will be used to facilitate the submission and evaluation of all course materials except for in person evaluations, exhibitions, and physical submissions as noted by specific assignment brief.

Course Learning Outcomes:

Upon completion of this course, students will develop knowledge and abilities as follows:

- An understanding of the tectonic levels of a building system including site, foundation, structure, and envelope.
- Knowledge of the basic construction systems utilized in Western traditions, including masonry, timber, concrete, steel.
- An understanding of the basic material properties and configuration of assemblies.
- An understanding of the basic envelope systems including light, heat and moisture transfer.
- Recognition of the relationship between manufacturing processes, components, and assemblies.
- A recognition of how resources are transformed, utilized, and recycled.
- A recognition of building construction's complex relationship contexts of environment/climate.

Learning Resources:

▪ Required readings, textbooks, and learning materials:

The course makes use of ***Constructing Architecture: Materials, Processes, Structures: A Handbook*** by Andrea Deplazes and categorizes it as a strongly recommended textbook and future resource for students pursuing a professional architectural education and future practice. Further suggested readings and published resources below:

- Allen, E., & Iano, J. (2017). *The architect's studio companion : rules of thumb for preliminary design*. John Wiley & Sons, Inc.
- Allen, E., & Iano, J. (2019). *Fundamentals of building construction : materials and methods* (7th ed.). Wiley.
- Burry, M., & Burry, J. (2016). *Prototyping for architects*. Thames & Hudson Ltd.
- Ching, F. D. K. (2020). *Building Construction Illustrated*. John Wiley & Sons.
- **Dall, A., Malterre-Barthes, C., & Gough, J. (2024). *Material reform: Building for a post-carbon future*. MACK. (Textbook)**
- **Deplazes, A. (2022). *Constructing Architecture*. Birkhäuser. (Textbook)**
- Lewis, P., Tsurumaki, M., & Lewis, D. J. (2016). *Manual of section*. Princeton Architectural Press, Cop.
- Lewis, P., Tsurumaki, M., & Lewis, D. J. (2022). *Manual of Biogenic House Sections*. Oro Editions.
- Zimmermann, Astrid, et al. *Constructing Landscape : Materials, Techniques, Structural Components*. Basel, Birkhäuser, 2015.

▪ Technology requirements:

- To successfully engage learning experiences at the University of Calgary, students taking 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;
 - 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
 - Most current laptops will have a built-in webcam, speaker and microphone.
 - [Student IT Resources](#)
- To complete coursework the following software is required during the semester. Please note that free trials are available for many of the following but acquiring access on an ongoing as necessary basis is the responsibility of individual students:
 - **Adobe Creative Suite** (InDesign, Photoshop, and Illustrator required. Lightroom and Acrobat recommended.)

Additional Classroom Conduct and Related Information:

- **Code of Conduct:** The SAPL Studio spaces and other SAPL/University-provided facilities and equipment are governed by the [University's Student Non-Academic Misconduct Policy](#). Professional and courteous behavior is expected at all times. For more information, please refer to [Appendix 1: Prohibited Conduct](#), including the following categories: 1. Protection of Individuals; 2. Protection of Property; 3. Protection of University Functions, Activities and Services; 4. False Information and Identification; 5. Possession or Use of Dangerous Objects, Drugs or Alcohol; 6. Aiding in the Commission of an Offence; 7. Contravention of Other Laws and University Policies; and 8. Failure to Comply with a Sanction.
- **Guidelines for Zoom Sessions in Remote Synchronous 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.
 - 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 Microsoft 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.

Assessment Components:

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the Academic Calendar. In determining the overall grade in the course the following weights will be used:

Assessment Method	Description	Format	Weight
Weekly Quiz	Brief D2L quiz using various question formats to confirm receipt and comprehension of lecture materials <u>at the end of class</u> .	Individual	10 x 4% (40%)
Interim Report: <i>Emergent Materials</i>	A written research report demonstrating understanding of basic material principles through examination of the changing architectural material landscape.	Individual	20%
Final Project: <i>Constructed Assemblies</i>	Extensive group research and design project examining and physically simulating a specific architectural assemblage.	Group	35%
Participation	Peer evaluations of Final Project Working Groups	Individual	5%

*Project scaffold is subject to change with respect to developing conditions in the studio and student progress, as discussed in class.

■ Assessment and Evaluation Information:

- If a student misses (or is late for) a required component of the course for a valid excuse or absence, they must contact the instructor in writing within 24 hours to discuss applicable options to submit and/or make-up for that component.
- Alternate arrangements for missed in-person assessments with a valid excuse will be made on a case-by-case basis at the discretion of the Instructor and upon review of the student's class participation and attendance record.
- For example, students who have missed an in-person assessment (e.g., oral presentation) as a result of an excused absence may be asked—if *applicable to the assessment*—to submit a self-recorded video (via Zoom's auto-record feature) in lieu of an in-person engagement.
- For assessments submitted online (e.g., D2L), late assignments *with a valid excuse may* be considered for grading without penalty at the discretion of the Instructor and upon

review of the student's class participation and attendance record. Otherwise, the course's standard grade penalties (indicated below) will apply.

- For assessments submitted online (e.g., D2L), all late assignments *without a valid excuse* will lose a letter grade (e.g., A- to B-) every 24 hours after the submission date/time. Late assignments submitted more than four days late constitute an automatic zero (0).
- Missed in-person assessments (e.g., oral presentation, exam, etc.) as a result of an *unexcused* absence will receive an automatic zero (0).

▪ **Attendance and Participation Expectations:**

- Students are expected to attend and come prepared to meaningfully engage in all class sessions. This includes producing or preparing content necessary for discussion and contributing to individual and class-wide discussions and/or conversations/assessments with the Course Instructor.
- **Excused Absences:** In the event of an exceptional circumstance (e.g., illness, bereavement, etc.) or an exceptional opportunity (e.g., varsity athletic competition, national conference or awards ceremony, pow wow, etc.) up to four excused absences (for courses that meet twice or more per week) and up to two excused absences (for courses that meet once per week) are allowable per semester before jeopardizing one's own course grade and ability to pass the course. However, any such arrangements must be approved by the Instructor with advance notice by the student.
- **Unexcused Absences:** Attendance at all class sessions and participation in all assessments is mandatory. Unexcused absences in excess of two per semester (for courses that meet twice per week) and one per semester (for courses that meet once per week) are grounds for failure in the course.
- **Total Number of Absences:** The combined total number of excused AND unexcused absences per semester cannot exceed four per semester (for courses that meet twice per week) or two per semester (for courses that meet once per week). Any number in excess are grounds for failure in the course.

▪ **Guidelines for Submitting Assignments:**

- All assignments (e.g., projects, papers, presentations, etc.) must be turned in on time.
- Please submit all assignments electronically through Dropbox in D2L. Assignments may be submitted in PDF format (unless otherwise stated). Assignments should have a file name as follows: "Coursenumber_semester_Lastname-Firstname_assignment-title" (e.g., DSGN201_F24_Smith-Alex_Plan-Drawings).
- Students are responsible for ensuring that all submitted digital files are in the correct format, complete, and accessible. Submissions that are corrupt, empty, incorrect (e.g., wrong file type), or inaccessible may receive a grade of zero. It is not the Instructor's responsibility to verify or notify students of submission errors. Students are encouraged to double-check their uploads and retain confirmation of successful submission.

- **Late Assignments:** Please see above for the course's policy on late assignments/assessments.
- **Final Examinations:**
 - This course has no final examination.
- **Expectations for Writing:**
 - Please see the "Copyright and Legislation" Section of the University of Calgary Policies and Supports for information on the use of AI in this course.
 - Section E.2 Writing Across the Curriculum:
<https://calendar.ucalgary.ca/pages/2c2d1ce47b8c4d008aec9cc3da49876e>
- **Criteria that must be met to pass:** A passing grade of 60% or more is required on any assignment worth 30% or more of course weighting to pass the course in whole.

Grading Scale:

Based on [Section F.1.1](#) of the Academic Calendar

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding performance
A	4.00	3.85-4.00	90-94.99	Excellent performance
A-	3.70	3.50-3.84	85-89.99	Approaching excellent performance
B+	3.30	3.15-3.49	80-84.99	Exceeding good performance
B	3.00	2.85-3.14	75-79.99	Good performance
B-	2.70	2.50-2.84	70-74.99	Approaching good performance
C+	2.30	2.15-2.49	65-69.99	Exceeding satisfactory performance
C	2.00	1.85-2.14	60-64.99	Satisfactory performance
C-	1.70	1.50-1.84	55-59.99	Approaching satisfactory performance. Minimum grade requirement for SAPL prerequisite courses.
D+	1.30	1.15-1.49	50-54.99	Marginal pass. Insufficient preparation for subsequent courses in the same subject.
D	1.00	0.50-1.14	45-49.99	Minimal Pass. Insufficient preparation for subsequent courses in the same subject.
F	0.00	0-0.49	0-44.99	Failure. Did not meet course requirements.

Flexible Grade Option (CG Grade):

As per [Section 3.5.1](#) of the Academic Calendar, the School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School, with the exception of the following courses:

- Architecture 201
- Landscape Architecture 201
- Planning 201

Topic Areas and Detailed Class Schedule:

Note: All Dates subject to change with respect to cohort development, as discussed in class.

Course Schedule Date	Week Topic	Assignments/Due Dates
Sep 7	First Class Course Intro / Earth	
Thu Sep 11	Materials 1 Masonry / Concrete	Weekly Quiz (4%)
Thu Sep 18	Materials 2 Wood 1 / Wood 2	Weekly Quiz (4%)
Thu Sep 25	Materials 3 Fiber / Metals	Weekly Quiz (4%)
Thu Oct 2	Materials 4 Final Project Intro / Site Sys.	Weekly Quiz (4%)
Wed Oct 8	<i>City Futures: Undergraduate Design Research Symposium</i>	
Thu Oct 9	Systems 1 Foundations / Armatures	Weekly Quiz (4%) Interim Report due (20%)
Thu Oct 16	Systems 2 Enclosures / Workshop 1	Weekly Quiz (4%)
Thu Oct 23	Systems 3 Energy 1 / Mechanical	Weekly Quiz (4%)
Thu Oct 30	Systems 4 Acoustics / Circularity	Weekly Quiz (4%)
Thu Nov 6	Standards 1	Weekly Quiz (4%)
Nov 9-15	<i>Term Break, No Classes</i>	
Thu Nov 20	Project Presentations	Final Project due (35%) Peer Evaluations due (5%)
Thu Nov 27	Standards 2	Weekly Quiz (4%)
Thu Dec 4	Last Class Guest Presentations	Weekly Quiz (4%)

University of Calgary Policies and Supports:

UNIVERSITY OF CALGARY COVID-19 UPDATES AND PROCEDURES

<https://www.ucalgary.ca/risk/emergency-management/covid-19-response/covidsafe-campus>

ACADEMIC ACCOMMODATION

<https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>

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/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>

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).

[Student Accessibility Services](#) 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 Procedures please visit:

- Student Academic Misconduct Policy: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy>
- Student Academic Misconduct Procedure: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-procedure>

Additional information is available on the Academic Integrity Website at

<https://www.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 (<https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy>) 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/legal-services/university-policies-procedures/student-non-academic-misconduct-policy>).

Notice to Students Regarding Use of Generative Artificial Intelligence (AI) Applications and Tools in Learning Environments

The use of generative AI, including the use of work created by generative AI tools and applications in course assignments and assessments may be considered in accordance with the university's academic misconduct policy. <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy> If you are in doubt as to the use of generative AI tools in this course, please discuss your situation with the course instructor.

- AI tools can be used for learning course material but not for completing assignments.
- The use of AI tools for assignments may be considered an academic offense.
- Students must not copy or paraphrase from AI applications for assignments.

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.

PROTECTION OF PRIVACY ACT

The University of Calgary (University) respects your privacy and is committed to ensuring the privacy of all students, staff, and community members. UCalgary's collection, use, and disclosure of your personal information is authorized under section 4(c) of the Alberta [Protection of Privacy Act](#) (POPA). It will be collected, used and disclosed as permitted under POPA and in accordance with the University's [Privacy Policy](#) and [Notice of Collection, Use and Disclosure of Student Personal Information](#). All student assignments and personal information provided to your course instructor will remain confidential unless otherwise stated before submission. It will not be disclosed to anyone else without your permission unless permitted under POPA.

SEXUAL AND GENDER-BASED 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 and Gender-Based Violence Policy guides us in how we respond to incidents of sexual and/or gender-based violence, including supports available to those who have experienced or witnessed sexual/gender-based violence, or those who are alleged to have committed sexual/gender-based 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/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy>.

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://calendar.ucalgary.ca/uofcregs/university-regulations/reappraisal-term-work>) which describes how to have a grade reappraised.

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