

**Department of Civil and Environmental Engineering, Carleton
University**

**CIVE5603/BLDG5201: ADVANCED BUILDING
CHARACTERIZATION, CONSERVATION AND REHABILITATION**

COURSE SYLLABUS – FALL 2026

INSTRUCTOR: Dr. **Mario Santana Quintero**, Professor
mario.santana@carleton.ca
613-520-2600 x7468 – Office x 3093,
Office: Canal Building, Office 5207 (5th floor)
Lab: Carleton Immersive Media Studio (CIMS)
Visualization & Simulation (VSIM) Building, 4th floor

CLASS LECTURES: Thursday 8:35 pm to 11:25 pm [REDACTED]

Course description

This course will provide graduate students with an understanding of the fundamental concepts and techniques for the identification, documentation and conservation of heritage buildings and existing buildings. The course includes lectures and workshops by experts representing the key disciplines and practice areas involved in heritage conservation and documentation.

The course comprises three hours per week of lectures, plus additional activities assigned by the course instructor.

At the completion of the course, the student will be able to:

- Discuss and show the fundamental concepts involved in the identification and conservation of heritage places in Canada and internationally;
- Describe digital workflows for identifying, recording, modelling, assessing, analyzing and interpreting existing buildings and sites;
- Explain and adopt ethical obligations when applying digital tools to capture and disseminate information about heritage sites;
- Use and conduct research to identify heritage values and attributes of buildings and sites;
- Use and conduct techniques for recording and modelling existing buildings and sites;
- Use and conduct techniques for energy modelling;
- Use and conduct research on construction materials, assemblies and building envelopes for rehabilitation and preventative maintenance purposes;
- Describe the role of monitoring systems in improving the maintenance and care of existing buildings;
- Describe and apply heritage conservation approaches such as heritage impact assessments and conservation plans;

- Explain the roles of different disciplines, government authorities and organizations in heritage conservation and rehabilitation; and
- Explain and apply ethical principles in heritage decision making

Prerequisites: open to all graduate students with a particular interest in heritage buildings.

Biographical sketch of instructor

Professor Mario Santana Quintero has contributed to the conservation of precious World Heritage sites worldwide through his innovative digital documentation methods. He is co-chair of the UNESCO Chair on Digital Twins for World Heritage Conservation and holds cross-appointments in the Department of Civil and Environmental Engineering and the Azrieli School of Architecture and Urbanism, both within the Faculty of Engineering and Design at Carleton University. He is also a faculty member at the Carleton Immersive Media Studio (CIMS).

In addition to his academic work in Canada, he served as the immediate past Secretary-General of the International Council of Monuments and Sites (ICOMOS), president of ICOMOS Canada, member of the Association for Preservation Technology College of Fellows, Doctorate Honoris Causa from the University of Liège (Belgium), and is one of the Honorary Presidents of the ICOMOS Scientific Committee on Heritage Documentation (CIPA). He has collaborated on numerous international heritage documentation initiatives with institutions such as the Getty Conservation Institute and UNESCO.

Evaluation

Assignment 1 (Selection of a Site)	5%
Assignments 2 through 4 (worth 10 % each)	30%
Group Project	45%
Course compliance: students are expected to participate in lectures and class discussions. Absences will generally be excused only for emergencies or remote access issues. Also, this includes successfully using the software provided for class. Important: here you are acknowledging that the course outline has been read and understood.	20%

Course Materials

All relevant course materials, including lecture videos, notes, readings, and other resources, will be posted to Brightspace.

Students should download “Standards and Guidelines for the Conservation of Historic Places in Canada” from the Canada’s Historic Places website: <https://www.historicplaces.ca/en/pages/standards-normes>

Assignments

You will complete five assignments and one group project throughout the term. They will be posted at least two weeks before they are due. Refer to course schedule on Brightspace for deadlines.

Late assignments may be accepted, but only with the instructor's permission and a 10% per-day mark reduction. Assignments are to be completed individually; evidence of direct copying will be treated as cheating and will be handled accordingly (i.e., reported to the Dean's office).

Attendance and participation

Students are required to attend all activities. **Attendance at least 70% of the course activities is required to pass.** Success in the course depends upon participation in course activities, class discussions, and completion of readings. Absences will generally be excused only for emergencies or justified reasons.

You must also submit the Informed Consent Agreement and Student Consent to Publish forms on time. Students are expected to submit both forms by the specified deadline.

For class Schedule – download from Brightspace

Exams

There are no exams in this course.

Software

Students may need to download the following software to complete the course project:

- Reality Scan (Epic Games) <https://www.realityscan.com/>
- Agisoft Metashape PRO (photogrammetry, 30-day free licenses available) - <https://www.agisoft.com/downloads/installer/>
- Smartphone's apps, such as RealityScan, Scaniverse, or LUMA
- Autodesk AutoCAD (student licenses available)
- Autodesk Recap (student licenses available)
- A simulation software of their choice to complete the course project

Textbook/Learning Materials and their costs

Students are not required to purchase textbooks or other learning materials for this course.

Historic Places

This semester, the class will analyze heritage assets within the proposed Golden Triangle Heritage Conservation District in Ottawa, in collaboration with the City of Ottawa. Each student team will select one building of interest within the study area for closer analysis.

Please read and carefully follow the **Fieldwork Instructions** for all assignments that involve on-site work.

The purpose of these assignments is to learn by doing. As you conduct your fieldwork, please remember that you are working in a lived neighbourhood. Respectful and considerate behaviour toward residents, property owners, businesses, and neighbours is therefore essential.

If someone asks what you are doing, simply explain that you are a Carleton University student completing a building conservation assignment as part of the course. Please be courteous, avoid disrupting residents or businesses, and always respect private property.

Your conduct in the field should reflect the same professionalism, respect, and care that we expect when working with heritage communities and the City of Ottawa.

Communication

The primary means of communication with the course instructor. There will be no dedicated office hours. Virtual or in-person meetings with the course instructor can be scheduled upon request.

Academic Integrity and Plagiarism

- a) Please consult the Faculty of Engineering and Design information page about the Academic Integrity policy and our procedures: <https://carleton.ca/engineering-design/current-students/fed-academic-integrity> Violations of the Academic Integrity Policy will result in the assignment of a penalty such as reduced grades, the assignment of an F in a course, a suspension or, expulsion.
- b) One of the main objectives of the Academic Integrity Policy is to ensure that **the work you submit is your own**. As a result, it is important to write your own solutions when studying and preparing with other students and to avoid plagiarism in your submissions. The University Academic Integrity Policy defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This includes reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source.

Examples of violations of the policy include, but are not limited to:

- any submission prepared in whole or in part, by someone else;
- using another’s data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own; and
- failing to acknowledge sources of information through the use of proper citations when using another’s work and/or failing to use quotations marks.

Unauthorized Dissemination

As per Carleton's [Academic Integrity Policy](#), Unauthorized Dissemination is a violation of the standards of academic integrity to publish, disseminate, or otherwise make available to a third-party instructional material where the instructor has explicitly prohibited their dissemination.

The materials (including the course outline, slides, posted notes, videos, labs, projects, assignments, quizzes, exams, and solutions) created for this course are intended for personal use only. They may not be reproduced, redistributed, or disseminated in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without written permission from the author(s), both during and after the semester.

Generative Artificial Intelligence (GenAI)

As our understanding of the uses of GenAI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of GenAI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Safer Learning and Working Environment

Carleton University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the [Department of Equity and Inclusive Communities](#) at equity@carleton.ca, [Ombuds Services - Carleton University](#) or submit an anonymous human rights concern through [this form](#).

Academic Accommodations

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

Engineering Academic Advising

[The Engineering Academic Support Service](#) assists undergraduate engineering students with course selection, registration, and learning support from first-year through to graduation.

Academic Advisors Contact can be found here: <https://carleton.ca/engineering-design/current-students/undergrad-academic-support/undergraduate-advisors/>.

Student Mental Health and Wellness

As a university student you may experience a range of mental health challenges that can significantly impact your academic success and overall well-being. Carleton's [Wellness Services Navigator](#) is designed to help students connect with mental health and wellness resources.

If you need to talk to someone from the department for more information and support with connecting to resources, you can contact the following faculty members, depending on your program. Or contact the department.

Department: CEEUGChair@cunet.carleton.ca

Prof. Shoeleh Shams

Email: shoelehshams@cunet.carleton.ca, Office: 4242 Mackenzie

Building Engineering: Prof. H. Burak Gunay (Director and Associate Chair of Graduate Studies for Building Engineering)

Email: burak.gunay@carleton.ca, Office: 5206 Canal Building

Here is a list of on-campus and off-campus resources:

1. [Emergencies and Crisis](#)
2. **Carleton's Wellness Desk:** Located at 204A MacOdrum Library, is a space for students to learn about resources, connect with our Wellness Coordinator, and decompress during stressful times of the year. You can pop into the Wellness Desk any time during its hours of operation – no appointments necessary! <https://wellness.carleton.ca/mental-health/wellness-desk/>
3. **Carleton's Care and Support Team:** The role of a Care and Support Team is to support students with any questions or concerns they may have relating to their academics, well-being, finances or any other challenges they may be experiencing. <https://wellness.carleton.ca/mental-health/student-care-and-support-team/>
4. **Carleton's Health and Counselling Services:** To book an appointment visit the [CHR Connect App](#) or contact the main clinic by calling 613-520-6674 ext. 2. If urgent, let the Patient Care Coordinator know or go in person to the main clinic (2500 Carleton Technology and Training Centre Building) and indicate that they are in crisis and need to speak to someone right away. <https://wellness.carleton.ca/counselling/>
5. **Carleton's Single Session Counselling:** To book an appointment visit the CHR Connect App. <https://thconnect.telushealth.com/mobile-app-information/xz6lzGrv>
6. **Residence Counselling and Wellness Service:** Counselling services specifically for students in residence. To book an appointment call 613-520-2600 ext. 8061. <https://carleton.ca/health/residence-counselling/>

7. **Carleton's Therapy Dogs:** Carleton's therapy dogs are around campus with their owners (who are Carleton University staff and faculty) to comfort and provide support to help you thrive as a university student. <https://wellness.carleton.ca/mental-health/therapy-dogs/>
 8. **Good2Talk (1-866-925-5454):** Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/36 <https://good2talk.ca/>
 9. **The Walk-In Counselling Clinic (off-campus community resource):** The Walk-in Counselling Clinic has offices in various locations across Ottawa and the greater Champlain region that are open 7 days a week. Individuals will be assisted, with no appointment, on a first-come, first-serve basis during the Walk-in Counselling Clinic hours. The Walk-in Counselling Clinic **offers services in many languages** and is free and confidential. More information can be found at: <https://walkincounselling.com/>
 10. **Distress Centre of Ottawa and Region:** Available 10am-11pm, 7 days/week, 365 days/year. **Distress Line:** 613-238-3311, **Crisis Line:** 613-722-6914 or 1-866-996-0991, **Text:** 343-306-5550. <https://www.dcottawa.on.ca/>
 11. **Distress and Crisis Ontario,** Available for chat 2 pm – 2 am EST. <https://www.dcontario.org/>
 12. **BounceBack Ontario (Toll-Free: 1-866-345-0224)** is a free skill-building program managed by the Canadian Mental Health Association (CMHA). It is designed to help adults and youth 15+ manage low mood, mild to moderate depression and anxiety, stress or worry. Delivered over the phone with a coach and through online videos, you will get access to tools that will support you on your path to mental wellness. <https://bouncebackontario.ca/>.
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CIVE5603/BLDG5201 Advanced Building Characterization, Conservation and Rehabilitation:

CLASS SCHEDULE – FALL 2026

	Week	Session	Topics	Assignments
1	Sept 10	Course Introduction	Introduction Outline / Schedule Introduction to the Golden Triangle Heritage Conservation District (City of Ottawa – Taylor Quibell / Lauren Luchenski) Informed Consent forms explanation	
2	Sept 17	Conservation of Historic Places	Statement of Significance Recognizing Existing and Historic Buildings UNESCO World Heritage Convention	A02: Applying Standards and Guidelines Introduced Group Project Introduced
3	Sept 24	Recording Historic Places	Digital Photography (Christian Ouimet)	A03: Recording a Historic Place introduced A01: Selection of a site due (8:30 AM)
4	Oct 1	Recording Historic Places	Introduction to 3D Scanning Digital Photogrammetry Processing digital assets for Historic Places	Deadline to submit Informed consent forms (due 8:30 AM)
5	Oct 8	Condition Assessment of Historic Places	Materials Deterioration Performance	A04: Condition Assessment of a Historic Place introduced

6	Oct 15	Modeling Historic Places	Open-Source applications for Building modeling and emerging Digital Twins (Nicolas Arellano)	
7	Oct 22	Best Practices	Preparation of a Conservation Plan	A02: Standards and Guidelines due (11:30 AM)
8	Oct 29 – Reading Week			
9	Nov 5	Computational modeling of Historic Places	Graduate research seminar 1: Digital heritage Recording workflow (Elyse Hamp) Computational Modeling in Conservation Engineering (Bora Pulatsu)	
10	Nov 12	Presenting Historic Places	Digital Storytelling (Katie Graham)	A03: Recording a Historic Place due (11:30 AM)
10	Nov 19	Best Practices	Heritage Recording in Conflict Areas and difficult sites	A04: Condition Assessment of a Historic Place due (11:30 AM)
11	Nov 26	Understanding Building Performance	Conservation of Historic Places Krista Rowan – Historic Buildings Performance Tutorial on how to upload Course Report dataset on dataverse	
12	Dec 3	Closing	Key Messages	
13	Dec 10	Presentations	Student presentations and course feedback	<u>Dec 10 – presentations are due before 8:30 am</u>
	Dec 23			Course Project due

