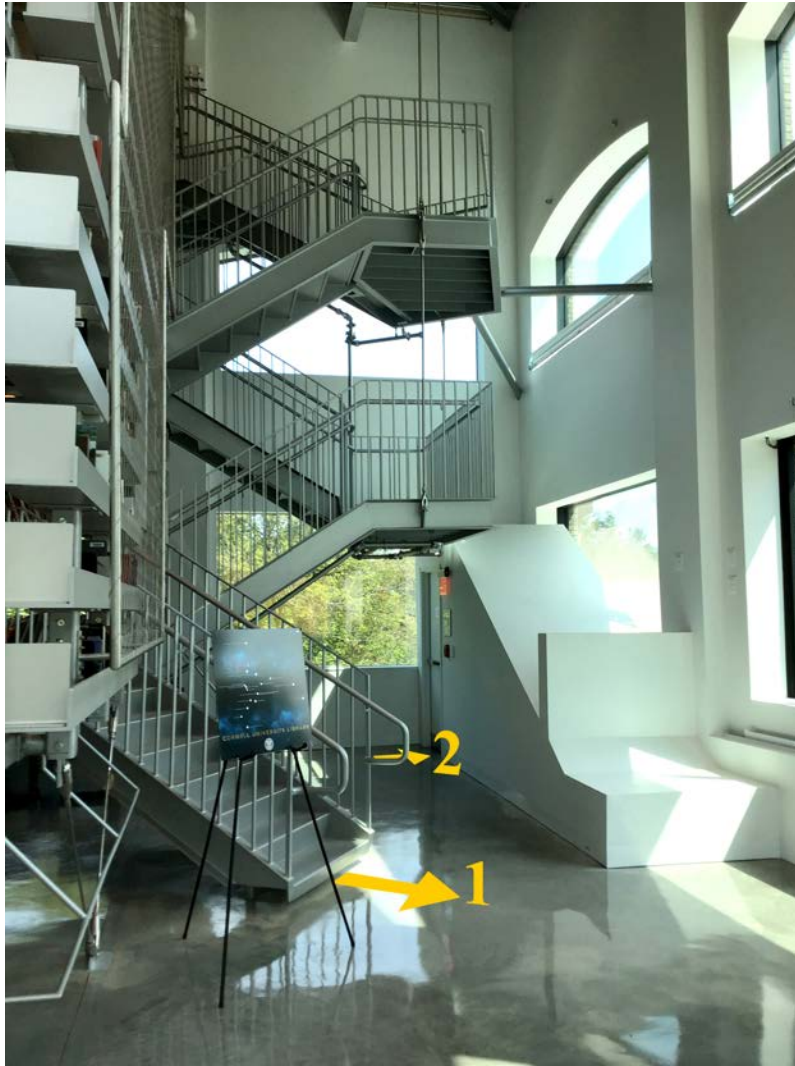


ARCH 4605-6605 Advanced Fire- and Life-Safety Concepts



Course description: Advanced fire- and life-safety concepts are examined in building codes and through an in-depth analysis of academic buildings at Cornell University.

Architecture is both logical and expressive. The expressive function of architecture needs to be built upon an underlying logical base. Eschewing logic as a basis for expression is possible but the buildings that result from such an attitude will have many problems. Life is hard enough as it is: resist the temptation.

Fall 2021

Time: Mondays and Wednesdays 1:00 pm – 2:15 pm

Instructor: Jonathan Ochshorn (jo24@cornell.edu)

3 credit hours

revised 09/13/21

Instructor: Jonathan Ochshorn
221 W. Sibley Hall, jo24@cornell.edu, 607 255-1194

Office Hours: 10:00 – 11:00 am Fridays — see:
<https://jonochohorn.com/academics/officeHours/>

Grading: Letter grade only for B.Arch, M.Arch, and MS-AAD students

I. Rationale:

Safety is a fundamental requirement of buildings, yet it is not always prioritized in the design process. Many architects resist implementing fire- and life-safety measures, even when such measures are required by codes, fearing that doing so will compromise their “design ideas.” The following quote from a representative for the architect-of-record for the Mui Ho Fine Arts Library at Cornell, while scary, is not atypical: “...we wouldn’t be able to do a lot of things that brought up design ideas that are done today, if you strictly interpret the Code the way it was intended.”¹

II. Course Aims and Objectives:

Aims

The goal of this course is to provide students with a more advanced understanding of fire- and life-safety provisions in building codes.

NAAB Specific Learning Objectives:

The department is required by the National Architectural Accrediting Board (NAAB), as part of the accreditation process, to collect specific course material for each course taught. See Section XIV below.

III. Format and Procedures:

Course is in seminar format. There will be some visits to campus buildings during class.

IV. My Assumptions

Architecture is both logical and expressive. The expressive function of architecture needs to be built upon an underlying logical base. Eschewing logic as a basis for expression is possible, but the buildings that result from such an attitude will have many problems. Life is hard enough as it is: resist the temptation.

V. Course Requirements:

1. Attendance is required.

2. Course readings:

Students will read excerpts from the New York State Building Code and the ICC Commentary to the International Building Code. Other readings dealing specifically with the political theory of fire safety and with fire- and life-safety issues in Rand-Milstein-Sibley Hall will be provided by the instructor.

3. How many credits? 3

¹ Harris Feinn, representing the architects-of-record (STV) for the Mui Ho Fine Arts Library at Cornell, Transcript of New York State Division of Building Standards and Codes Capital Region Hearing Board, Petition 2020-0449, p.65, beginning on line 7.

4. Additional requirements:

Students will have weekly assignments, including readings in preparation for class discussion and some sketch analyses based on fire-safety principles.

VI. Grading Procedures: Grades will be based on:

- **Final project** 20% course grade
- **Attendance (AKA “participation”)**, 40% course grade
- **In-class presentation**, 20% course grade
- **Weekly assignments**, 20% course grade

VII. Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity:

<https://theuniversityfaculty.cornell.edu/dean/academic-integrity/code-of-academic-integrity/>

Any work submitted by a student in this course for academic credit will be the student's own work, except in the cases of projects that are specifically structured as group endeavors. Work by others shown in presentations and excerpted in papers must be properly cited and credited.

Students are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. Students can give "consulting" help to or receive "consulting" help from such students.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Pursuant to Copyright Law of the United States (Title 17 of the U.S. Code) and Cornell University Policy 4.15, faculty own the copyright to all original course content – their copyright embodies course lectures as well as notes summarizing or capturing the lecture content. Students may take and use lecture notes solely for personal scholarship, and may share lecture notes only with others enrolled in the subject course. Students may not post, copy, republish, distribute or share lecture, course, or class content in any form or medium with anyone not enrolled in the subject course absent the express written permission of the faculty copyright holder. This prohibition applies to any platform or medium to which course lectures or notes are posted for the purpose of further distribution, whether for-profit or fee-free. Impermissible uses of copyrighted content constitute acts of copyright infringement and may further subject the student to violation(s) of the Code of Academic Integrity.

1. Student IP:

Students own the copyright to their work except under conditions specified in University Policy. The instructor and department may use students' copyrighted works in their teaching, lectures, etc., internal to the course. If the Instructor wishes to further display or distribute the work beyond Cornell's academic environment, the instructor will obtain of express permission from the student and provide appropriate attribution. Permission forms will be available in the College communications office.

2. Images of students:

For reasons including FERPA, DACA, and other privacy concerns, student permission is required before sharing photos or vides taken in studio, class, or on a field trip.

VIII. Diversity and Inclusion

We (i.e., the administrators who created this text, but not necessarily the course instructor, who believes that "design," aka "architecture," is more often a tool to reinforce wealth and power) believe that design is a principal instrument of positive social change, and that progress and innovation are driven by a commitment to inclusion across race, class, ethnicity, gender, age, religion, ability and identity. For this reason, we explicitly confirm our resolute commitment to accelerate Cornell University's actions to be a diverse and inclusive institution. We embrace the responsibilities of ongoing internal critical reflection, dialogue, and action as individuals and as a community. We support the Cornell teaching community—our faculty, staff, and students—in their efforts to act with an ethos of inclusivism and antiracism in creating and sustaining diverse teaching and learning environments.

Bias-related Incident Reporting System

Cornell University is committed to fostering a safe, respectful, and inclusive living, learning, and working environment for our entire community. The bias-related incident reporting system is one step toward promoting that we, as an institution, live out these values. The reporting system allows for you to safely and anonymously report an incident you may have experienced or witnessed, receive support, and explore options for resolution.

To report an incident, individuals can use one of the following methods:

- *By submitting an incident report online at <https://www.biasconcerns.cornell.edu/> (non-emergency)*
- *By contacting the [Cornell University Police Department \(CUPD\)](#) at (607) 255-1111 or 911 for emergency assistance*

IX. Accommodations for students with disabilities

In compliance with the Cornell University policy and equal access laws, the instructor is available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for in unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

X. Religious Holidays

Cornell University is committed to supporting students who wish to practice their religious beliefs. Students are advised to discuss religious absences with their instructors well in advance of the religious holiday so that arrangements for making up work can be resolved before the absence.

The New York State Legislature (since July 1, 1992) requires all institutions (public and private) of higher education not to discriminate against students for their religious beliefs. Accordingly, the pertinent parts of Sections 3 and 4 of the law state:

“3. It shall be the responsibility of the faculty and of the administrative officials of each institution of higher education to make available to each student who is absent from school, because of his or her religious beliefs, an equivalent opportunity to . . . make up any examination, study or work requirements which he or she may have missed because of such absence on any particular day or days...”

“4. If . . . classes, examinations, study or work requirements are held on Friday after four o’clock post meridian or on Saturday, similar or makeup classes, examinations, study or work requirements shall be made available on other days, where it is possible and practicable to do so.”

A list of religious holidays can be found here:

<https://scl.cornell.edu/religiousholidays>

XI. Land Acknowledgement

The Department of Architecture acknowledges that Cornell University is located on the traditional homelands of the Gayogohó:nq’ (Cayuga Nation). The Gayogohó:nq’ are members of the Haudenosaunee Confederacy, an alliance of six sovereign Nations with a historic presence on this land. The Confederacy precedes the establishment of Cornell University, New York State, and the United States of America. We acknowledge the painful history of Gayogohó:nq’ dispossession, and honor the ongoing connection of Gayogohó:nq’ people, past, and present, to these lands and waters.

XII. Tentative Course Schedule (subject to change and elaboration)

Week 1

ARCH 4605-6605 class begins next week.

I. Introduction

Week 2

Mon., Aug. 30: Introduction to health, safety, and welfare

Wed., Sept. 1: The politics of fire-safety

II. Compartmentation

Week 3

Mon., Sept. 6: Labor Day, NO CLASS

Wed., Sept. 8: Horizontal assemblies and vertical openings: Atriums

- Separation from adjoining spaces; exceptions (any 3 floors)

Week 4

Mon., Sept. 13: Horizontal assemblies and vertical openings: Mezzanines

Wed., Sept. 15: Mezzanines (continued)

- Mezzanines in atriums
- Can openings coincide with occupied spaces?
- Basis of atrium and mezzanine exception to compartmentation

- **Discussion:** *Rand Hall rooftop art gallery separation from atrium and open steel-grate floors*

Week 5

Mon., Sept. 20: Smoke control in atriums

- **Discussion:** *Rand Hall atrium smoke control system*

Wed., Sept. 22: Campus atrium smoke control examples

- Rand, Weill, Klarman Halls

Week 6

Mon., Sept. 27: Fire walls and fire barriers

- NFPA 221 double firewalls
- Rand Hall options

Wed., Sept. 29: Fire barriers: Milstein Hall case study

III. Allowable floor area

Week 7

Mon., Oct. 4: Occupancy

- Circulation spaces and occupant load factors
- Plumbing fixtures
- **Discussion:** *Rand Hall rooftop occupant load and plumbing fixtures*

Wed., Oct. 6: Milstein crit room case study.

Week 8

Mon., Oct. 11: **Fall break; no class**

Wed., Oct. 13: Construction type

- Milstein case study: separated vs. nonseparated; fire wall vs. fire barrier.
- Milstein Hall: Construction of fire barriers

Week 9

Mon., Oct. 18: Sprinklers

Wed., Oct. 20: Frontage

- **Discussion:** *Rand Hall (combined building) second floor area limit*

IV. Allowable height in stories

Week 10

Mon., Oct. 25: Allowable building height, measured in feet or stories

- Mezzanines as floors
- Bulkheads and penthouses
- Rooftop occupied spaces

Wed., Oct. 27: Allowable height (continued)

- Rand Hall case study: 2013 variance vs. 2016 proposal vs. current proposal
- **Discussion:** *Rand Hall height limit and rooftop bathrooms as mezzanine*

V. Means of egress

Week 11

Mon., Nov. 1: Overview of means of egress systems

- Exit access
- Exits, including horizontal exits
- Exit discharge, including exceptions for lobbies
- Characteristics: No other activities allowed, continuity, independence (what is "an exit" in the Code?)

Wed., Nov. 3: Case studies: campus buildings

- Common path of egress travel
- Dead ends
- Exit access travel distance

Week 12

Mon., Nov. 8: Exit access stairways and their limits in atriums

Wed., Nov. 10: Exit access stairways

- Rand Hall case study
- **Discussion:** *Rand Hall unenclosed stair as exit access stairway*

Week 13

Mon., Nov. 15: Interior exit stairways and enclosure exceptions

- Rand Hall case study
- **Discussion:** *Rand Hall unenclosed stair as interior exit stairway*

Wed., Nov. 17: Interior exit stairways (continued)

- Rand Hall case study
- **Discussion:** *Rand Hall unenclosed stair as interior exit stairway*

VI. Elevators

Week 14

Mon., Nov. 22: Elevators

- As accessible means of egress
- Sized for ambulance stretchers

Wed., Nov. 24: Elevators (continued)

- **Discussion:** *Rand Hall elevators and ambulance stretchers*

VII. Synopsis

Week 15

Mon., Nov. 29: Student presentations and discussion

Wed., Dec. 1: Student presentations and discussion

Week 16

Mon., Dec. 6: Student presentations and discussion (if needed)

Final project

TBA

XIII. Additional Resource Readings

The primary readings are available online:

- *New York State Building Code* (various years): <https://codes.iccsafe.org/codes/new-york>
- *ICC Commentary* to the International Building Code: Access via Cornell Library portal (search under “MADCAD”).
- Ochshorn, “Appeal regarding building code violations in Cornell's Fine Arts Library”: <https://jonochshorn.com/scholarship/writings/rand-appeal-2020/>
- Ochshorn, “Critique of Milstein Hall: Fire Safety”: <https://jonochshorn.com/scholarship/writings/milstein-critique/fire.html>

XIV. Co-meeting Courses For co-meeting courses only: Graduate assignment: Per New York State Department of Education, graduate level courses must be 5000 level and must be differentiated from the undergraduate course. Please be specific about how the assignment(s) for graduate and undergraduate students will differ.

- There is no difference between B.Arch (undergraduate) and M.Arch (graduate) instruction or assignments in this course, since there is no rationale for differentiating between undergraduate and graduate students within building technology pedagogy. Undergraduate students and graduate students at Cornell have the same background and preparation (i.e., none) for this course. The same accreditation expectations for course content apply equally to undergraduate and graduate professional architecture students. There is nothing in graduate students’ prior education that might justify a differentiated curricular response in this course. This is an advanced elective course for *both* undergraduate and graduate students, who have both taken the same required introductory Building Technology course that is prerequisite to this course. This elective course does not build upon prior intellectual knowledge or practical experience that might otherwise distinguish graduate students from their undergraduate peers.

XV. NAAB

A. Program Criteria (PC)

PC.2 Design—How the course instills in students the role of the design process in shaping the built environment and conveys the methods by which design processes integrate multiple factors, in different settings and scales of development, from buildings to cities.

Course specific elaboration: Relates abstract design theory to fire- and life-safety considerations. Week 2 introductory lecture and ongoing seminar discussion.

B. Student Criteria (SC): Student Learning Objectives and Outcomes

SC.1 Health, Safety, and Welfare in the Built Environment—How the course ensures that students understand the impact of the built environment on human health, safety, and welfare at multiple scales, from buildings to cities.

SC.2 Professional Practice—How the course ensures that students understand professional ethics, the regulatory requirements, the fundamental business processes relevant to architecture practice in the United States, and the forces influencing change in these subjects.

SC.3 Regulatory Context—How the course ensures that students understand the fundamental principles of life safety, land use, and current laws and regulations that apply to buildings and sites in the United States, and the evaluative process architects use to comply with those laws and regulations as part of a project.

SC.4 Technical Knowledge—How the course ensures that students understand the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects