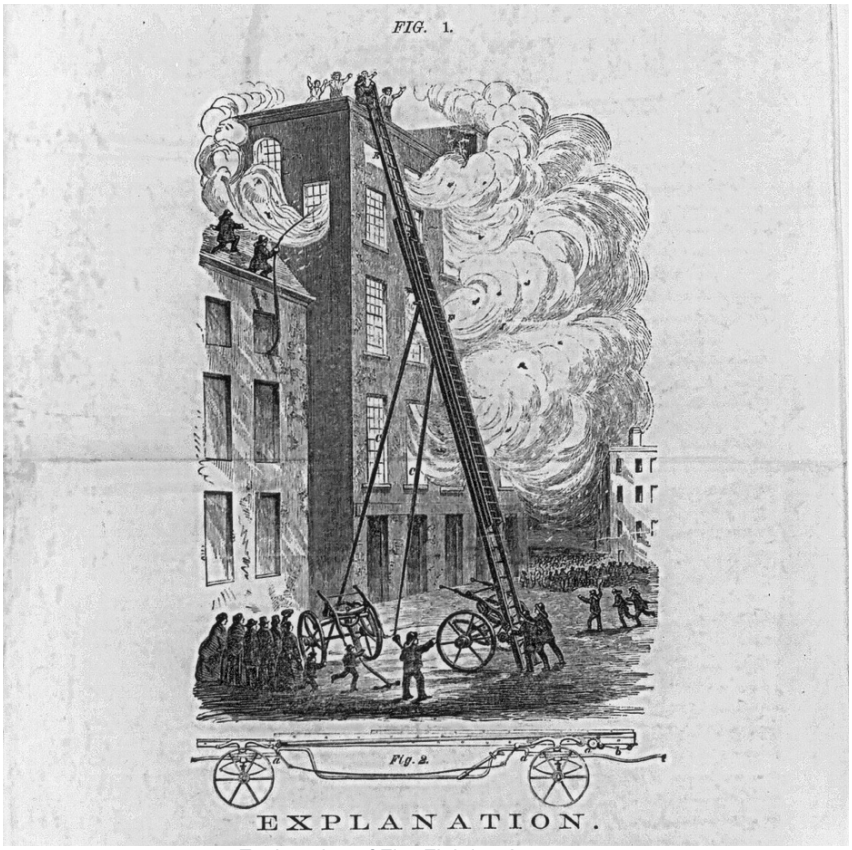
**New Jersey School of Architecture**

**Life Safety Issues in Contemporary Buildings**
**ARCH 649 006**
**Spring 2024 Judy K Chöi RA, AIA, LEED AP**
**3 credits, 3 contact hours.**

Tuesdays | Friday 2:30-3:50 pm
Class Location: Faculty Memorial Hall, 313
Office Hours: By appointment
Prerequisite: Completion of Core Sequence



Explanation of Fire-Fighting Apparatus.
Photograph. Retrieved from the Library of Congress, <www.loc.gov/item/2007680175/>.

**Course Description**: A variety of life safety and comfort situations are studied in different building types. Topics include building evacuation, compartmentalizing, fire fighting and suppression, evaluation and testing of new building materials and systems, systems control and management. Special attention is placed on multi-use, high-density buildings.

The class will be a comprehensive exploration of life safety issues, combining theoretical knowledge of codes with practical applications through historic and current case studies. Lessons will be structured around lectures, films, group discussion sessions, quizzes, and a final project, for a well-rounded learning experience.

**Class Structure**

- **Lectures on Codes**
  - In-depth exploration of IBC 2024, NFPA 101 and other relevant codes.
  - Understanding the rationale behind the development of these codes.
  - Historical context of life safety regulations and their evolution.
- **Case Studies:**
  - Analyzing historic and current case studies to understand real-world implications.
  - Drawing connections between incidents and existing codes.
  - Identifying gaps or areas where codes were not sufficient.
- **Work Sessions**
  - Putting students in the position of code creators through interactive sessions.
  - Encouraging critical thinking and problem-solving skills.
  - Simulating scenarios where students propose new codes based on case studies.
- **Powerpoint Presentations** (Based on current studio Project)
  - Identifying applicable life safety codes
  - Provide plan drawings, spreadsheets, and diagrams of how project responds to each life safety code
- **Research Paper**
  - 3 page paper that evaluation of a failure in the context of life safety.
  - Identifying existing codes that could have addressed the failure.
  - Proposing new codes or modifications to existing ones for improved safety.

**Assessment:**

- Weekly homework assignment/quizzes to ensure understanding of code concepts.
- In-class workshops to apply theoretical knowledge to practical scenarios.
- Requirement for students to give a PowerPoint presentation, fostering communication and presentation skills.
- Midterm and Final Exams

**Course Learning Outcomes:**

This course will guide students to achieve the following competencies:

- Understand Life Safety and and its history.
- Understand the reasoning behind life safety codes and its changes.
- Recognize impacts on design regarding code compliance.
- To design an environment that can be reasonably safe from fire and other emergencies by protecting and improving the survivability of occupants
- Understand classifications of occupancy and hazard of contents
- Calculate egress requirements, sizing, and arrangement
- Determine which safeguards are appropriate for various building types

**GRADING**

| | | |
|---|---|---|
| Class participation | | 10% |
| Code Worksheet | (4%) | |
| Group discussions | (4%) | |
| Attendance | (2%) | |
| Case Studies Analysis/Quizzes | | 15% |
| Case Studies | (5%) | |
| Workshops | (5%) | |
| Quizzes | (5%) | |
| Research Paper | | 15% |
| Topic Submittal | (2%) | |
| Outline | (3%) | |
| Final Paper | (10%) | |
| Power Point presentation | | 20% |
| Preliminary PDF | (5%) | |
| Presentation | (15%) | |
| Midterm Exam | | 20% |
| Final Exam | | 20% |
| | | **100%** |

**Preliminary Schedule**

| Week | Day | | Class topic | READING ASSIGNMENT |
|---|---|---|---|---|
| | Monday | 1/15/24 | Martin Luther King Day | |
| 1 | Tuesday | 1/16/24 | INTRODUCTION<br>HISTORY OF LIFE SAFETY CODES | ***Applying the Building Code***, Chapter 1-4 |
| | Friday | 1/19/24 | NFPA, IBC, IFC<br>CODES AND APPLICATIONS | ***IBC,*** Chapter 2<br>***NFPA 101,*** Chapter 3 |
| | Monday | 1/22/24 | Last Day to Add/Drop a Class | |
| 2 | Tuesday | 1/23/24 | OCCUPANCY AND CLASSIFICATIONS | ***IBC,*** Chapter 3<br>***NFPA 101***, Chapter 6 |
| | Friday | 1/26/24 | Case Studies: Industrial/Manufacturing | ***Applying the Building Code***, Chapter 5-7 |
| 3 | Tuesday | 1/30/24 | SPECIAL REQUIREMENTS BASED ON OCCUPANCY AND USE | ***IBC*** Chapter 4<br>***Applying the Building Code***, Ch 8-10 |
| | Friday | 2/2/24 | Case Studies: Place of Assemblies | |
| 4 | Tuesday | 2/6/24 | Building Heights and Areas | ***IBC***, Ch 5<br>Ap***plying the Building Code***,Ch 11 |
| | Friday | 2/9/24 | Case Studies: High Rise | |
| 5 | Tuesday | 2/13/24 | Types of Construction | ***IBC***, Ch 6<br>***NFPA 101***, Sec 8.2 |
| | Friday | 2/16/24 | Case Studies: Hotel | |
| 6 | Tuesday | 2/20/24 | Fire Rated Construction | ***IBC***, Ch 7<br>***NFPA 101***, Ch 8 |
| | Friday | 2/23/24 | Workshop- Based on Studio Project<br>RESEARCH PAPER TOPIC DUE | ***Applying the Building Code***, Ch 12-15 |
| 7 | Tuesday | 2/27/24 | Means of Egress:<br>Egress Components | ***IBC***, Ch 10<br>***NFPA 101***, Ch 7, Sec 12.2, 13.2, 14.2, 15.2, 16.2, 17.2, 18.2, 19.2, 20.2, 21.2, 22.2, 23.2, 28.2, 30.2, 31.2, 36.2, 37.2, 38.2, 39.2, 40.2, 42.2 |
| | Friday | 3/1/24 | Means Of Egress:<br>Occupant load | ***Applying the Building Code***, Ch 16-20 |

| Week | Day | | Class topic | READING ASSIGNMENT |
|---|---|---|---|---|
| 8 | Tuesday | 3/5/24 | Means Of Egress: Egress and Exits<br>PDF OF PRELIM POWER POINT DUE | |
| | Friday | 3/8/24 | Workshop- Means of Egress<br>RESEARCH PAPER OUTLINE DUE | |
| | 3/9/24- | 3/18/24 | SPRING BREAK--NO CLASS | |
| 9 | Tuesday | 3/19/24 | Power Point Presentaton: Speed Review with retired NYC Plan Examiner | |
| | Friday | 3/22/24 | Power Point Presentaton: Speed Review with retired NYC Plan Examiner | |
| 10 | Tuesday | 3/26/24 | MIDTERM | |
| | Friday | 3/29/24 | Good Friday, No Class | |
| 11 | Tuesday | 4/2/24 | Fire Protection Systems: Passive | ***IBC***, Ch 8<br>***NFPA 101***, Ch 8, 9 |
| | Friday | 4/5/24 | Case Studies: Residential | |
| 12 | Tuesday | 4/9/24 | Fire Protection Systems: Active | ***NFPA 101***, Secs 12.3, 13.3, 14.3, 15.3, 16.3, 17.3, 18.3, 19.3, 20.3, 21.3, 22.3, 23.3, 24.3, 26.3, 28.3, 29.3 30.3, 31.3, 36.3, 37.3, 38.3, 39.3, 40.3, , 42.3 |
| | Friday | 4/12/24 | Case Studies: High Rise | |
| 13 | Tuesday | 4/16/24 | Interior finishes | ***IBC***, Ch 8<br>***NFPA 101***, Ch 10 |
| | Friday | 4/19/24 | Exterior Walls | ***IBC***, Chapter 26, Sec 1405,<br>***NFP 285***<br>***Pyrotechnic Cities,*** Chapter 7 |
| 14 | Tuesday | 4/23/24 | New areas of research-Green materials | ***Fire Safety Challenges of Green Buildings*** |
| | Friday | 4/26/24 | New areas of research-Resiliency<br>RESEARCH PAPER DUE | ***Incorporating Resiliency Concepts into NFPA Codes and Standards*** |
| 15 | Tuesday | 4/30/24 | **Final Exam** | |
| | Friday | 5/3/24 | Last day of Class | |

**Bibliography:**
**Required Readings:**

*International Building Code 2021*. International Code Council, Inc., 2020.
https://www-madcad-com.libdb.njit.edu:8443/library/ICC-IBC-2021-1stptg/

NFPA 101®, *NFPA 101® Life Safety Code® 2024 Edition* (Quincy: National Fire Protection Association, 2021)
https://link.nfpa.org/free-access/publications/101/2024

Geren, Ronald L. *Applying the Building Code : Step-by-Step Guidance for Design and Building Professionals*. Wiley, 2016.
*https://ebookcentral-proquest-com.libdb.njit.edu:8443/lib/njit/reader.action?docID=4426788&ppg=1*

Ross, Liam. *Pyrotechnic Cities: Architecture, Fire-Safety and Standardisation*. 1st ed., Routledge, 2022, https://doi.org/10.4324/9781003026297.
https://primo.njit.edu/permalink/01NJIT_INST/97f46a/cdi_openaire_primary_doi_0d4681f3d3e84609b5a456ce2fc2251b

Dungan, Kenneth W. *Incorporating Resiliency Concepts into NFPA Codes and Standards*. 1st ed. 2016., Springer New York, 2016, https://doi.org/10.1007/978-1-4939-6511-3.
https://link-springer-com.libdb.njit.edu:8443/book/10.1007/978-1-4939-6511-3

Meacham, Brian., et al. *Fire Safety Challenges of Green Buildings*. 1st ed. 2012., Springer New York, 2012, https://doi.org/10.1007/978-1-4614-8142-3.
https://www.proquest.com/legacydocview/EBC/1398517?accountid=35725

**Recommended Readings**

Ching, Francis D. K. *Building Codes Illustrated: A Guide to Understanding the 2021 International Building Code*. Hoboken, New Jersey, John Wiley & Sons, Inc, 2014. ISBN 9781119772521

Musser, April, P.E. "Assembly Occupancy Fires that Wrote NFPA 101." *Consulting - Specifying Engineer*, vol. 60, no. 1, 2023, pp. 44-47.
https://www.proquest.com/trade-journals/assembly-occupancy-fires-that-wrote-nfpa-101/docview/2769542799/se-2?accountid=35725

Levy, Matthys., and Mario George Salvadori. *Why Buildings Fall down : How Structures Fail*. 1st paperback ed., W.W. Norton, 1994. https://primo.njit.edu/permalink/01NJIT_INST/dcbe8h/alma99963973405196

**NAAB CRITERIA OBJECTIVES**

The National Architectural Accrediting Board accredits NJIT's architecture program. The NAAB has Shared Values of the Discipline and the Profession that must be covered by any architectural curriculum to attain their approval.

This course satisfies the following shared values:

**PC.2 Design**—How the program 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.

**PC.4 History and Theory**—How the program ensures that students understand the histories and theories of architecture and urbanism, framed by diverse social, cultural, economic, and political forces, nationally and globally.
**PC.5 Research and Innovation**—How the program prepares students to engage and participate in architectural research to test and evaluate innovations in the field.

**PC.6 Leadership and Collaboration**—How the program ensures that students understand approaches to leadership in multidisciplinary teams, diverse stakeholder constituents, and dynamic physical and social contexts, and learn how to apply effective collaboration skills to solve complex problems.

**PC.7 Learning and Teaching Culture**—How the program fosters and ensures a positive and respectful environment that encourages optimism, respect, sharing, engagement, and innovation among its faculty, students, administration, and staff.

**Student Criteria (SC): Student Learning Objectives and Outcomes**

**SC.1 Health, Safety, and Welfare in the Built Environment**—How the program 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 program 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 program 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 program 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.

## ADMINISTRATIVE POLICIES

**Grading:**
https://www.njit.edu/registrar/policies/grading.php

| Grade | GPA | Significance |
|---|---|---|
| A | 4.0 | Excellent |
| B+ | 3.5 | Good |
| B | 3.0 | Acceptable |
| C+ | 2.5 | Marginal Performance |
| C | 2.0 | Minimum Performance |
| F | 0.0 | Failure |
| I | | Incomplete |
| W | | Approved Withdrawal |
| AU | | Audited (no academic credit) |
| S or U | | Satisfactory or Unsatisfactory |
| P | | Passing for Master's Thesis or Doctoral Dissertation |

**KEPLER/CANVAS**
Kepler is now part of Canvas. Students should upload to folders that parallel the Assignments page of Canvas in pdf format at the file size used for presentation. Please login at: canvas.njit.edu/ Additional Instructions will be forthcoming.

**Attendance and Tardiness:**
All absences are to be reported to the Dean of Students so they can determine if they are excused and/or accommodated.
Your attendance is expected in class and you will be counted absent if you do not arrive to class on time.

**Academic Integrity / Plagiarism**:
Academic integrity and honesty are of paramount importance. Cheating and plagiarism will not be tolerated. The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. All students are responsible for upholding the integrity of NJIT by reporting any violation of academic integrity to the Office of the Dean of Students. The identity of the student filing the report will remain anonymous. All students are expected to adhere to the University Code on Academic Integrity link and to the Code of Student Conduct link.

**Resources on Mental Health & Covid-19**
https://researchguides.njit.edu/mentalhealth
https://www.njit.edu/pandemicrecovery/vaccination-requirement-njit-community-members

**Students with Disabilities:**
It is the school's moral, ethical, and legal obligation to provide appropriate accommodations for all students with physical and/or learning disabilities. If students need an accommodation related to disabilities, all official documentation must be filed with the Dean of Students and the Disability Support Service Office. It is the responsibility of the student to notify the instructor at the beginning of the semester if accommodations are warranted.
Dean of Students: https://www.njit.edu/doss/
Disability Support Service: http://www.njit.edu/studentsuccess/disability-support-services-0/

**Well-being:**
Taking care of yourself is as important as your other responsibilities to your classes, work, family and anything else that is part of your life. If you are struggling, please feel free to reach out to your instructor. NJIT has the Center for Counseling and Psychological Services (C-Caps) which is open and is offering online help https://www.njit.edu/counseling/

**Citations:**
The HCAD librarian Maya Gervits has assembled excellent resources on copyright, plagiarism citing, and avoiding plagiarism: http://researchguides.njit.edu/c.php?g=671665&p=4727920

**Copyright, Rights and Publication:**
All student work, both digital and physical, may be retained by the New Jersey School of Architecture, HCAD, NJIT for accreditation purposes, academic reference, design competitions, conferences, papers, institute publications, public display, and publicity both in print and online. NJSoA/HCAD/NJIT retains the right to a copy of all academic material prepared by students in conjunction with all courses and research. Only students enrolled in this specific course are to have access to the educational and reference materials provided. This includes, but is not limited to, videos, music, sounds, books, e-book links, journal and magazine articles, online images, and links to any other publication and tutorials from any source. Students are to comply with all intellectual property laws. Academic materials and references are not to be transmitted, shared, posted online, to be accessible, seen or used by any third party. Nor are they to be used beyond the academic assignments of the course. All materials including images, videos, recordings, live presentations, which are part of this course, are not to be screen captured or recorded and made public at any time or in any manner. All educational and reference materials are to be deleted completely, included from all storage devices before the last day of the semester. Registration or participating in any manner in this course constitutes implicit agreement with all these requirements.

**LEARNING CULTURE**
In addition to the overarching values and ethics of the university, the New Jersey School of Architecture (NJSoA) is dedicated to optimism, diversity and solidarity, professional conduct, constructive evaluation and instruction, collaborative community, health and wellbeing, time management and school-life-work balance, respectful stewardship and space management, and well-rounded enrichment. The pedagogy of architecture and design is as complex as it is rewarding, and as dynamically evolving as the people who learn and teach it. This understanding resides at the core of the NJIT Learning and Teaching Culture Policy: https://design.njit.edu/learning-and-teaching-culture-policy