

Synopsis:

Introduction to Historic Structures + Systems (ISS) is the complement to first semester's *Introduction to Architectural Materials*. While the first semester focused largely on the materials that make up buildings historically such as stone, brick, terra cotta, concrete, mortar, plaster and wood, the spring semester directs its attention to the other words that constitute the name of the course: historic structures, systems and assemblies. In that context the course seeks to make a distinction with the previous semester. Rather than studying the materials and their particular characteristics individually, it approaches the building and its constituent parts as an assembly of particular materials. It studies the design, detailing and material together to understand how materials interact and assess their collective performance. The question will not be the condition of the individual material but are design, detailing and material the right solution for the visual and technical performance desired. The latter will take into account also such issues as environmental, public health and fireproofing considerations, which played an important role throughout the 19th and early 20th centuries.

The course material itself is divided into various parts. The first half of the semester is dedicated to an examination of more traditional building technology and focus on primarily load bearing wall systems. The second part after the spring break will examine the fundamental changes that occur in the building trades as a result of the Industrial Revolution. It deals with more developed building technologies as they began to emerge by the middle or the end of the 19th Century with steel or concrete structural framing systems and their exterior claddings of masonry, glass and metal curtain wall systems or concrete and stone panels. The last two or so sessions of the course will end with a discussion of some more modern systems and materials and the challenges presented by the preservation of modern architecture.

At all times not only will the historic technology be presented but also how it performs and what type of failures may be anticipated will be an integral part of the discussions.

Course Format:

The format of the course will be lectures occasionally with outside experts discussing particular subjects. During the lectures the students are encouraged to ask questions or raise issues related to the course. They may also be asked questions about their readings or to provide an explanation for conditions shown in the images displayed.

Course Requirements:

The course has three types of requirements that serve several different purposes:

a) Readings

Most of the subjects discussed in class will be accompanied by several publications dealing with the same subject. These readings are required and the student is expected to study the literature provided carefully. The literature is intended to complement the class lectures and present as broad a spectrum as possible. They are an integral and important part of the course material and questions about the readings may be included in the exams.

b) Exams

The course has two exams, one at midterm and one final. The exams will deal with the materials discussed in class and contained in the readings. However, they will also consist out of images of actual conditions that the student will be asked to describe and interpret. The exam will be in class on the dates noted in the schedule. During the exam the student is allowed to consult their notes, readings and class materials as posted on line.

c) Assignments Summary

Whereas the readings and exams focus on the study materials presented in class, the assignments are intended to test and train the student's own observations. Each student individually will have three assignments. They are progressive in nature and, to some extent, built on one another.

- 1) The first assignment will concern itself with very basic observations by the student about an actual building part in the field. It seeks to make the student think how the building was actually 'put together' and how it influenced the choices made during design and construction.
- 2) The second assignment will ask the student to record the physical conditions of a simple elevation and interpret the conditions observed.
- 3) The third assignment will deal with the collections in Avery Library where the student will be asked to study a modern material and provide observations on its use, adequacy and whether it is still in use.

Class Schedule and Topics:

The following is the class schedule and the topics for the different sessions. Some changes may occur because some of the classes are being taught by outside professionals and their schedules may change. In addition during the semester opportunities for site visits or other events may require reorganization of the schedule as presented here.

January 22	Session 1:	Introduction	Prudon
------------	------------	--------------	--------

Introduction

January 24	Session 2:	Foundations
------------	------------	-------------

Introduction to early foundation technologies and their use.

January 29	Session 3:	Wall Systems 1
------------	------------	----------------

Evolution of wall and partition systems throughout the 19th and early 20th century.

January 31	Session 4:	Wall Systems 2
------------	------------	----------------

Discussion of wall systems continued taking into account more recent development and how they relate back to older systems and challenges. Lessons to be learned.

February 5	Session 5:	Floor structures and systems 1
------------	------------	--------------------------------

The evolution of flooring systems taking into account such issues as span, fireproofing and sound transmission as early considerations.

February 7	Session 6:	Floor structures and systems 2
------------	------------	--------------------------------

Floor construction discussion continued and also the use of finishes and finish materials for flooring.

February 12	Session 7:	Windows and Doors	Michael F. Lynch
-------------	------------	-------------------	------------------

Openings, windows and doors are an essential part of walls. Admitting light and air their configuration, size and operation underwent considerable changes throughout the last two centuries.

February 14	Session 8:	Wood: framing and cladding 1	John Childs
-------------	------------	------------------------------	-------------

Introduction into the use of wood as a framing and surface material.

February 19	Session 9:	Wood: framing and cladding 2	John Childs
-------------	------------	------------------------------	-------------

Continuation of discussion of wood as a building material.

February 21	Session 10:	Roofing structures and Roofing 1	
-------------	-------------	----------------------------------	--

With the increase in building size and span the development of new structural systems and spanning methodologies became necessary. A gradual understanding of engineering requirements and the introduction of new materials new forms and techniques developed.

February 26	Session 11:	Roofing structures and Roofing 2	
-------------	-------------	----------------------------------	--

With the introduction of new structural forms also came an expansion of roofing materials available and used.

February 28	Session 12:	Building Analysis 1	Donald Friedman
-------------	-------------	---------------------	-----------------

Using the knowledge and understanding of building design and construction, the performance of a building can be analyzed and assessed.

March 5	Session 13	Walking tour or site visit	
---------	------------	----------------------------	--

A walking tour of lower Manhattan is to review conditions in the field visually.

March 7	Session 14	Building Analysis 2	
---------	------------	---------------------	--

Continuation of discussion of the assessment of building systems and structures performance.

March 12	Session 15	Historic Documentation	
----------	------------	------------------------	--

An important part of the assessment of historic buildings is the examination of historic documentation and their importance in the building conditions encountered. The significant change in building records and their importance caused by increased building and systems complexity.

March 14	Session 16:	Midterm	
----------	-------------	---------	--

Spring Break

March 26	Session 17:	Introduction to High Rise Framing Technology	
----------	-------------	--	--

With the arrival of the industrial revolution and the demand for different and larger structures building technology and building construction processes underwent significant changes.

March 28	Session 18:	Steel and Concrete 1	Donald Friedman
----------	-------------	----------------------	-----------------

Steel and concrete technologies were important factors in the evolution of buildings both in height and span.

April 2	Session 19:	Steel and Concrete 2	Donald Friedman
---------	-------------	----------------------	-----------------

Continuation of steel and concrete framing discussion.

April 4	Session 20	Masonry Cladding 1: Brick and Terra Cotta	
---------	------------	---	--

With the increase in technology for high framing also came the need to find different cladding technologies. After an initial transfer of loadbearing technologies, new systems developed.

April 9	Session 21	Masonry Cladding 2: Stone, Cast stone and Precast	
---------	------------	---	--

Aside from using traditional material technologies, new cladding systems developed using traditional materials.

April 11	Session 22	Curtain Wall 1: Metal and Glass	
----------	------------	---------------------------------	--

Historic window technologies underwent considerable changes in the 19th Century and the early 20th Century with greater emphasis on the importance of daylight for the execution of tasks as a concern of public health.

April 16	Session 23	Curtain Wall 2: Metal and Glass	
----------	------------	---------------------------------	--

Evolution of glass and framing technologies led to a new architecture by the middle of the 20th Century.

April 18	Session 24	Curtain Walls walking tour	
----------	------------	----------------------------	--

Walking tour probably in Lower Manhattan to view the different framing, cladding and curtain wall systems.

April 23	Session 25	Prefabrication and Mass Production	
----------	------------	------------------------------------	--

One of the important outcomes of the industrial revolution on building technology is the introduction of standards parts but also extends itself to the factory production of building components and sections. This session may take place at a manufacturing facility. To be determined.

April 25	Session 26	Modern Materials	
----------	------------	------------------	--

Modern materials in their temporality and systemic use as well as their environmental or health impact present different problems than more traditional materials.

April 30	Session 27	Review and Summary	
----------	------------	--------------------	--

Review and discussion of course results.

May 2	Session 28	Final Exam	
-------	------------	------------	--
