This course examines historic cultural objects in depth through a study of common traditional and contemporary building materials. We will examine basic properties of different materials, the ways they have been transformed into building elements, assemblies and systems, typical causes for their changes over time, and protocols for their conservation. The principal product of the class is a comprehensive and detailed building investigation, known as a Historic Structure Report, on a property chosen by each student.

One or more field trips to ongoing preservation projects will take place during the course of the semester.

There will be a take-home mid-term exam on building materials properties and characteristics, and several one-week exercises. Students are expected to present in class regularly information gleaned from the readings.

Grading:

| Exercise 1: Brief Building Description | 7.5% |
| Exercise 2: Building Condition | 7.5% |
| Midterm Exam on Building Materials | 25% |
| HSR Presentation | 5% |
| Historic Structure Report | 55% |

No more than two unexcused absences are permitted.

Required Texts:


Also Recommended:

- Mark Fram, *Well-Preserved*, Boston Mills Press
Jan. 27 - Week 1: Introduction
Explanation of the purpose, content and requirements of the course; review of the bibliographic materials and books on reserve. Plus the following topics:

The Nature of the Project Process
Analysis, Description and Prescription
The Project Team
The Secretary of the Interior’s Standards for HSRs
History, Condition, Program
Identifying a Treatment
Recommendations and Alternative Designs for Treatment
Project Cost Analysis
Management and Maintenance
The Nature of Materials
Performance = response over time
Behavior = how materials respond to environmental and man-made stresses
Material behavior is dependent on physical properties, manufacture, and installation
Stresses are dependent on location, system or assembly, and maintenance

Condition Analysis Tools and Techniques

Readings: Ching: 2.5-2.19; Arbogast, Chapters 1, 2 and 3; Preservation Briefs 17, 35, 43

Exercise 1: Building Description and Analysis: 5-10 pages max, text and images.

Feb. 3 - Week 2: Building Components I
Understanding a building: structure and enclosure

Structure
Gravity, Wind and other Lateral Loads
Tension, Compression, Shear, Moment, Deflection
Frames, Bearing Walls, Arches, and other means of spanning
Foundations, Walls, Roofs and the nature of assemblies

Exterior Enclosure Systems
Roofs and Walls
Doors and Windows

Reading Contract Documents, I
How to read and understand historic working drawings, especially wall and roof assemblies

Readings: Preservation Briefs 4, 8,13,19, 22, 29, 30, 42, 45, 47; Arbogast, Chapter 4

Exercise 1 Due
Exercise 2 Assigned: Condition Description and Assessment: 5-10 pages max, text and images.

Feb. 10 - Week 3: Building Components II
Understanding a building: Interiors and finishes

Systems and Materials
Walls, Floors, Ceilings
Plasters, Paints, Fabrics
Furnishings,
Lighting and Comfort

Reading Contract Documents, II
Schedules and other information on products and finishes
Readings: Preservation Briefs 18, 21, 23, 28, 34, 40; Arbogast: Chapter 9

Exercise 2 Due
Assignment 3: Identify project site. Submit a one page description of the building, its age, style and major condition issues.

Feb. 17 - Week 4: Wood
A brief look at the development of 18th, 19th and 20th century woodworking tools, technology & its effects on construction and decoration in what became known as the United States. The invention and evolution of fiberboard, Haskelite, plywood and glue-laminated timber. Timber properties; wood decay; insect infestation, protective measures; epoxy repair; considerations for the “replacement in kind” of wooden components and wood composites. Early phenolics and other “plastics”; their deterioration and conservation.

Reading: Weaver Ch. 4; Preservation Brief 9; Arbogast: Chapter 10

Assignment 3 Due
HSR: Begin historical research, statement of significance and description for your property. Due

Feb. 24 – Week 5: Stone
The classification of natural stones; stone availability and fabrication. The causes of building stone deterioration: natural defects; craftsmanship; chemical, physical & biological weathering. The chemistry of cleaning, preferred cleaning techniques, “consolidants,” and “sealants,” poultices, “waterproofing.”

Reading: Weaver Ch. 5; Preservation Briefs 2, 5, 7; Arbogast: Chapter 11

Mar. 2 - Week 6: Adobe, brick, terra cotta, and ceramic veneer
Manufacturing and development of these materials during the 18th, 19th, and 20th century. The conservation of earthen-based construction materials and ceramic veneer. Adobe and brick decay, cleaning and repointing brick; repair of roof tile; terra cotta, and the replacement of masonry units. Rising damp: its origins, monitoring and control.

Reading: Weaver Ch. 6

Mar. 9 - Week 7: Cements
The mining and manufacture, and use of limes, cements, plasters, “artificial stone,” concrete, reinforced concrete, and pre-cast concrete during the 18th, 19th and 20th centuries.

Readings: Weaver Ch. 7; Preservation Briefs 15, 21, 22, 23, 42; Chusid: Saving Wright, Chapter 5

Mar. 16 - Week 8: Metals
Ferrous and non-ferrous metal production and fabrication during the 19th and 20th century; nail cutting; hardware study. Decay in iron, steel, copper, bronze, tin, lead, and aluminum; prominent alloys; repair and restoration techniques.

Readings: Weaver Ch. 9; Preservation Brief 27; Arbogast: Chapter 12

Take Home Midterm given out in class, due by 10:00 am March 21 in professor’s mail box in Rm. 106 W. Sibley

Plastics, Curtain Walls, Linoleum, etc. How modern architecture may, or may not, differ from traditional architecture in terms of integrity and authenticity.

Readings: Prudon, Chapters 1, 2, 4 ; Jester

Part 1 of HSR Due: History, Significance and Description
Begin Part 2 of HSR: Condition Description. Due April 13
Mar. 30 - Week 10: Spring Break

April 6 - Week 11: Updating Systems and Accessibility
Natural ventilation, heat gain and heat loss in historic structures; insulation; condensation and conservation. Long- and short-term maintenance, fire codes, fire protection, security systems, public access/handicapped accessibility problems.

Readings: Preservation Briefs 24, 32

Apr. 13 – Week 12: Work Weekend
Prepare for, and participate in, the annual work weekend

Part 2 of HSR is due in Professor’s mailbox: Condition Assessment
Begin Part 3 of HSR: Recommendations for Treatment and Cost Estimate

Apr. 20 - Week 14: Estimating Project Budgets
Material take-offs, labor rates, location, and other components of project estimating

April 27 - Week 15: Site Visits
Individual site visits with professor

May 4 – Week 16: Site Visits
Individual site visits continued

May 11– Week 17: Class Presentations
Individual 20-minute presentations summarizing the findings of the HSR

May 18 – Complete HSR Due
All three parts of the HSR to be assembled and turned in by 4 pm to 106 W. Sibley.

Note: HSR is to be printed in 12 pt. type, 1.5 line spacing, with double-sided printing. The HSR is to be securely bound, and have covers. Also required: an executive summary and a table of contents.