I. Rationale
This course examines historic cultural objects in depth through a study of common traditional and contemporary building materials. It provides a basis for understanding the technical challenges of preserving historic properties and sites, as well as best practices for the conservation of historic fabric.

II. Course Aims and Objectives
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. Students will be able to identify various approaches to the evaluation of historic materials regarding integrity, condition, and performance, as well as develop an understanding of treatment options for historic materials.

III. Format and Procedure
Classes will consist of a mix of lecture, discussion of readings, and hands-on investigations of building materials, including one or more field trips to ongoing preservation projects over the course of the semester.

IV. Course Requirements
1. No more than two unexcused absences are permitted. Students are expected to present in class regularly information gleaned from the readings.

2. Course readings:

Also Recommended: Mark Fram, *Well-Preserved*, Boston Mills Press
3. The course is 3 credits

4. Additional requirements: none

V. Grading Procedures
There will be a take-home mid-term exam on building materials properties and characteristics, and several one-week exercises.

Grading:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Exercise 1: Brief Building Description</td>
<td>7.5%</td>
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<tr>
<td>Exercise 2: Building Condition</td>
<td>7.5%</td>
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<tr>
<td>Midterm Exam on Building Materials</td>
<td>25%</td>
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<tr>
<td>HSR Presentation</td>
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Historic Structure Report  55%

VI. Academic Integrity
Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. http://cuinfo.cornell.edu/Academic/AIC.html
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.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

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.

VII. Accommodations for students with disabilities
In compliance with the Cornell University policy and equal access laws, I am 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 unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

VIII. Tentative Course Schedule: (May change to accommodate guest presenters)
Jan. 25 - 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 Assigned: Building Description and Analysis: 5-10 pages max, text and images.

Feb. 1 - 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. 8 - 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. 15 - 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 infestations, 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

Feb. 22 – 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. 1 - 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. 8 - 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. 15 - 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. 29 - Week 10: 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

April 5 – Week 11: Spring Break

Apr. 12 – 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. 19 - Week 14: Estimating Project Budgets
Material take-offs, labor rates, location, and other components of project estimating

April 26 - Week 15: Site Visits
Individual site visits with professor

May 3 – Week 16: Site Visits
Individual site visits continued

May 10– Week 17: Class Presentations
Individual 20-minute presentations summarizing the findings of the HSR

May 17 – 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.