CRP 5640 BUILDING MATERIALS CONSERVATION

COLLEGE OF ARCHITECTURE, ART & PLANNING — CORNELL UNIVERSITY
Graduate Program In Historic Preservation Planning — Spring 2012
Prof. Jeffrey Chusid — T.A. Katherine Coffield
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Wednesdays 9:05AM - 12:05PM, 211 W. Sibley Hall — 3 credits

This course studies 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	10%
	Historic Structure Report	50%

No more than two unexcused absences are permitted.

Required Texts:
Martin Weaver, *Conserving Buildings*, Wiley 1997
US Dept of Interior, *The Preservation of Historic Buildings* (on line and in print)

Also Recommended:
Mark Fram, *Well-Preserved*, Boston Mills Press
Robert Young, *Historic Preservation Technology*, Wiley, 2008
Theodore Prudon, *Preservation of Modern Architecture*, Wiley, 2008
Bernard Feilden, *Conservation of Historic Buildings*, Architectural Press, 2003
Francis D. K. Ching, *A Visual Dictionary of Architecture*, Wiley
Thomas C. Jester, Ed., *Twentieth-Century Building Materials: History and Conservation*

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

Readings: Preservation Briefs 17, 43; Fram, pp 40-55, 62-63

Parts of a Building; Structure and Structural Systems; and the Nature of Materials

Parts of a Building and Structural Concepts
- Gravity, Wind and other lateral Loads
- Tension, Compression, Shear, Moment, Deflection
- Frames, Bearing Walls, Arches, and other systems
- Foundations, Walls, Roofs and other assemblies

The Nature of Materials
- Performance = behavior/time. Behavior = properties x stresses.
- Condition analysis tools and techniques

Reading: Ching: 2.5-2.19; Fram: 64-67, 70-81; Preservation Brief 35

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

Feb. 1 - Week 2: Exterior Enclosures and their Materials

Systems
- Roofs and Walls
- Doors, Windows and Glazing

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

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

Feb. 8 - Week 3: Interior Finishes and their Materials

Systems and Materials
- Walls, Floors, Ceilings
- Plasters, Paints, Fabrics

Reading Contract Documents, II
- Schedules and other information on products and finishes

Readings: Preservation Briefs 18, 21, 23, 28, 34, 40

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

Feb. 22 – Week 5: No Class. New York City Field trip 2/23-2/25

Feb. 29 - Week 6: Stone

The classification of natural stones; stone availability and fabrication. The causes of building stone deterioration: natural defects; poor craftsmanship; chemical, physical & biological weathering. The chemistry of cleaning, preferred cleaning techniques, "consolidants," and "sealants," poultices, "waterproofing," and laser cleaning.

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

Mar. 7 - Week 7: 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. 14 - Week 8: 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. 21 - Week 9: Spring Break

Mar. 28 - Week 10: 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

Take Home Midterm given out in class, due by 10:00 am 3/30 in professor's mail box in Rm. 106 W. Sibley

April 4 - 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

Assignment: Part 1 of HSR Due: History, Significance, and Architectural Description

Apr. 11 - Week 12: The Preservation of Modern Architecture and Overview of 20th Century Building Materials

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

Assignment: Schedule site visits with professor.

Apr. 18 - Week 13: Project Economics

Dodge Cost Estimating and other components of a project budget

Assignment: Part 2 of HSR is due: Condition Assessment.

Apr. 25 - Week 14: Management and Maintenance Plans

Stewardship of the physical object after the project is ended.

Readings: TBA

May 2 - Week 15: HSR Class Presentations

May 11 - Part 3 of HSR due: Recommendations for Treatment and Cost Estimate.

All three parts of the HSR to be assembled and turned in by 4 pm to 106 W. Sibley.