CRP 5640 BUILDING MATERIALS CONSERVATION

COLLEGE OF ARCHITECTURE, ART & PLANNING — CORNELL UNIVERSITY
GRADUATE PROGRAM IN HISTORIC PRESERVATION PLANNING — Fall 2009
Prof. Jeffrey Chusid — T.A. Bryan McCracken
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This course studies the cultural object in depth by examining common historical and contemporary building materials with the intention of understanding their basic properties, 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 mid-term exam on building materials properties and characteristics, and several one-week exercises.

Grading:	Exercise 1: Brief Building Description	7.5%
	Exercise 2: Building Sketch	5%
	Exercise 3: Building Condition	7.5%
	Midterm Exam on Building Materials	20%
	Historic Structure Report	60%

No more than two unexcused absences are permitted.

Required Texts:

Fram, Mark: Well-Preserved, Boston Mills Press
Weaver, Martin: Conserving Buildings, Wiley 1997
McAlester, Virginia: A Field Guide to American Houses
US Dept of Interior: The Preservation of Historic Buildings (on line and in print)

Also Recommended:

Robert Young, Historic Preservation Technology, Wiley, 2008.
Theodore Prudon, Preservation of Modern Architecture, Wiley, 2008
Bernard Feilden, Conservation of Historic Buildings, Architectural Press, 2003

September 2nd **Introduction**

Explanation of the purpose, content and requirements of the course; review of the bibliographic materials and books on reserve.

The Nature of the Project Process
- Analysis, Description and Prescription
- The Project Team

Codes: Health and Life Safety
- Building, Mechanical, Electrical, ADA

The Secretary of the Interiors 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

Exercise 1: Building Description and Analysis: 5-10 pages max, text and images. Due 9/9.

September 9th **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

Case Study: The Freeman House
- Tying together analysis and treatment

Exercise 1 Due

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

Exercise 2: Condition Description and Assessment: 5-10 pages max, text and images. Due 9/16.

LAB: 5:15-7 pm: Building Tour

September 16th **History and Style**

Architectural Styles
- American residential (and some commercial) styles of the 17th to 20th centuries

Reading: McAlester: ; Fram 20-31

Exercise 3: Building Sketch identifying style features: at least 8.5 x 11, on plain or gridded paper, labeled.

September 23rd **Exterior Enclosures and their Materials**

Roofs, Walls

Doors, Windows and Glazing

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

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

September 30th Interior Finishes and their Materials

Walls, Floors, Ceilings

Plasters, Paints, Fabrics

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

October 7th 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, Preservation Brief 9

Lab: 5:15-7 pm Hands-on wood exercise

October 15th Fall Break

October 21st 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.

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; Preservation Briefs 2, 5, 7

Part 1 of HSR is due: History, Significance, Architectural Description (Exterior and Interior)

October 28 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; Preservation Briefs 15, 21, 22, 23, 42

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; Preservation Brief 27

November 4th MIDTERM EXAMINATION

November 11th 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

November 18th New v. Old: The Preservation of Modern Architecture

Readings: Prudon, Chapters 1, 2, 4

Freeman House and Joseph Stein Case Studies

Assignment: Schedule site visits with professor.

November 25th Overview of 20th Century Building Materials and Project Economics

Plastics, Curtain Walls, Linoleum, etc.

Dodge Cost Estimating and other components of a project budget

Readings: 20th Century Building Materials, Jester et al

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

December 2nd HSR Class Presentations

December 12th Part 3 of HSR due: Recommendations for Treatment and Cost Estimate. All three parts to be assembled and turned in by 4 pm to 106 W. Sibley.