

University of Mary Washington  
Department of Historic Preservation

Lab in Building Forensics HISP 461-01  
Fall 2010  
Combs Hall #009  
2:00 - 3:15 pm Monday & Wednesday

Instructor: Mr. Spencer  
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Office hours:  
Or by appointment

**I. Course Outline:**

Historic Preservation 461, Lab in Building Forensics, aims to study deterioration in historic structures by understanding its **causes, symptoms, and treatments**. This systematic and holistic approach includes understanding the design, construction, and development of the building under investigation. Accomplishing this will require the student to build upon skills learned in HISP 205 and 305 as well as other preservation courses. New skills will be acquired through lectures, field investigations, laboratory analysis, and hands-on remediation exercises.

**II. Course Objectives:**

- Understand basic building principles.
- Recognize symptoms and causes of deterioration.
- Record, analyze, and evaluate deterioration.
- Understand basic principles as well as “best practices” associated with conservation work.
- Understand and prescribe possible treatments for deterioration of historic materials, and structures.
- Develop the ability to communicate effectively with other disciplines involved in conservation.

**III. Texts:**

**Required:**

Watt, David S. *Building Pathology*. Second Edition. Oxford: Blackwell Publishing Company, 2007

**Reference and Supplemental Readings** (selected readings from these sources will be posted on Blackboard, <http://blackboard.umw.edu>, in accordance with educational copyright law. However, it is recommended that students evaluate these sources for potential purchase should their careers warrant their continued use).

Allen, Edward. *How Buildings Work: The Natural Order of Architecture*. Second Edition. New York: Oxford University Press, 1995.

Brand, Stewart. *How Buildings Learn: What Happens After They're Built*. New York: Penguin Books, 1995.

Forsyth, Michael, *Materials & Skills for Historic Building Conservation*, Oxford, UK: Blackwell Publishing, 2008.

Hoadley, Bruce. "Identifying Wood: Accurate Results with Simple Tools". Newtown CT: The Taunton Press, 1990.

McDowall, Christopher and Cynthia Rockwell editors, *Conservation of Architectural Heritage, Historic Structures and Materials*, ARC Laboratory Handbook, Rome, Italy, ATEL, 1999.

Robson, Patrick. "Structural Appraisal of Traditional Buildings". Dorset, UK: Donhead Publishing, 2005.

Simpson & Brown Architects, *Conservation of Plasterwork*, Edinburgh, UK: Technical Conservation, Research and Education Division, Historic Scotland, 2002.

Thomas C. Jester, ed. *Twentieth Century Building Materials: History and Conservation*. New York: McGraw-Hill Companies, 1995.

**Weaver, Martin E. *Conserving Historic Buildings: A Manual of Techniques and Materials*. Revised Edition. New York: Preservation Press, John Wiley & Sons, Inc., 1997.**

"Preservation Technology Primer: Readings from the APT Bulletin". ed. Frances Gale, Association for Preservation Technology International, 2008.

"Cleaning Techniques in Conservation Practice". ed. Kyle Normandin and Deborah Slaton, Dorset, UK: Donhead Publishing, 2005.

"Practical Building Conservation, volumes 1-5". New York: Halsted Press, 1988

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Preservation Briefs, No. 1-44. <http://www2.cr.nps.gov/tps/briefs/presbhom.htm> (free online)

Fielden, Bernard. *Conservation of Historic Buildings*, 3<sup>rd</sup> ed. UK: Architectural Press, 2003.

Fitchen, John, *Building Construction Before Mechanization.*, Cambridge, Mass.: The MIT Press, 1989.

Jandl, Ward H., ed. *The Technology of Historic American Buildings*. Washington D.C.: Foundation for Preservation Technology for the Association for Preservation Technology, 1983.

Oxley, Richard. "Survey and Repair of Traditional Buildings". Dorset, UK: Donhead Publishing, 2003.

Peterson, Charles E., ed. *Carpenters' Company: Building Early America*. Radnor, Pennsylvania: Thomas Nelson & Sons, Ltd., 1976.

Robson, Patrick. "Structural Repair of Traditional Buildings". Dorset, UK: Donhead Publishing, 1999.

Swallow, Peter and David Watt. "Surveying Historic Buildings". Dorset, UK: Donhead Publishing, 1996.

#### **IV. Equipment:**

Please purchase a notebook that you are comfortable taking into the field, I would recommend something with lines (gird paper).

#### **V. Grading Scale:**

As prescribed by Mary Washington College:

A	"Unusual Excellence"	(93% or higher = A ; 90-92% = A-)
B	"Work Distinctly Above Average"	(87-89% = B+ ; 83-86% = B ; 80-82% = B-)
C	"Work of Average Quality"	(77-79% = C+ ; 73-76% = C ; 70-72% = C-)
D	"Work of Below Average Quality"	(67-69% = D+ ; 60-66% = D)
F	"Failure, No Credit"	(0-59% = F)

\*If at midterm a student has a grade of D (0-66%) a "U" (unsatisfactory) will be entered.

In order to clarify grading criteria students will be exposed to examples of work associated with each grade level.

**VI. Assignments** (detailed assignment sheets will be handed out for each assignment and lab):

\*\*\*Labs will often entail working with your hands and sometimes dirty materials. Please wear appropriate clothing on lab days including no sandals.

*Archival Project (20%, due 10/13)*

Students will be required to utilize a variety of archival resources in the Fredericksburg area to gain further knowledge of their particular building. This will include the use of historic newspapers (Simpson Library), maps, HFFI archives, Fredericksburg Special Collections, Virginia room resources (RRL), deeds, court cases, and any other primary source information. Students will be expected to use this information to theorize about possible dates of construction, building development, builders, architects, and other concerns related to the final building interpretation and HSR.

*Lab #1 Wood Identification (10%, due 10/20)*

Students will use proper techniques to sample wood members from their historic structures in an effort to properly identify each. This will necessitate the student properly documenting each samples location, cataloging each sample, preparing each sample, and conducting optical analysis for identification purposes.

*Lab #2 Porosity (10%, due 10/27)*

Students will sample (or be provided) ceramic and masonry components of their structures using proper techniques. This will necessitate the student properly documenting each samples location, cataloging each sample, preparing each sample, and conducting porosity tests.

*Lab #3 Mortar Analysis (10%, due 11/8)*

Students will analyze mortar from their structure (taken during lab #2) using a simple acid digestion process. Because this process requires the use of acids which result in toxic fumes the lab will be conducted at Jepson. It is important to be up to date on lab safety and to have read your lab handout before coming to class. **You will be asked to leave (absolutely no exceptions) if it is apparent you have not properly prepared or if you violate rules such as removing eye protection.**

*Lab #4 Paint Analysis (10%, due 11/17)*

Students will utilize two simple techniques to analyze paint layers using class microscopes and Munsell color charts.

*Lab #5 Remediation (10%, due 11/29)*

Students will identify deterioration concerns occurring within their structure that they would like to have experience fixing. The number of exercises will depend on what type of problem is addressed. This will be hands-on.

*Historic Structures Report & Presentation (30%, due 12/6)*

Students will use all information gained throughout the semester as well as work done outside of class to compile an HSR. While students will be working in groups each student is required to turn in their own complete HSR (more specific details to follow). From this document each student will pick a topic from which they will present at the end of the semester (exam day). The presentation will be a 6-8 minute powerpoint and will be presented to a panel of preservation experts (from UMW and working within professional settings) as well as experts in relevant fields such as Chemistry, Biology, etc.

\*\*\*While some of these assignments will require that students work in groups it is imperative that all students turn in their own, complete work.

**VII. Attendance and Participation:**

The participation component of this class goes hand in hand with attendance. If you are not at class you will not be able to participate. For definition purposes participation for this class is not limited to speaking but also includes participation through observation, listening and being physically present. While there will be no attendance or participation grade, missed labs or site visits will not be repeated and may result in the student earning a 0%. The exceptions are excused absences (ex. conflicts with other classes) which will be determined on a case by case basis before the date in question or emergency situations, in which case the student must make efforts to notify the instructor as soon as possible. Students **will not** be excused for events such as leaving early for breaks, family reunions, family vacations, camps, etc. etc. If you have conflicts such as these consider dropping this course.

From time to time certain workshops or events might present themselves outside of class time. Students will be encouraged to attend these workshops, with possible extra-credit opportunities available.

**VIII. Late Assignments:**

Assignments are due at the beginning of class on the date noted in the syllabus. Unexcused late work will result in the loss of ten points (a full letter grade), if handed in after the start of class and an additional ten points for every 24 hrs overdue. **NO EXCEPTIONS (this will be taken very seriously)**. Should a student be absent for whatever reason they will need to e-mail the assignment to the instructor before class begins on the date the assignment is due. The following class, or the next class they physically attend, they will need to hand in a **hard copy** of the assignment. An absence does not excuse a late assignment. **No e-mailed assignments** (please do not forget your assignments) will be accepted from students present on the day an assignment is due. Excused late work is determined on a case by case basis by the instructor before the

assignments due date. If you have a valid excuse and an assignment conflict please contact me as soon as possible. **Documentation of your excuse may be required.**

**IX. Final Grade:**

The final grade will be based on the assignments below.

• Archives Project	20%
• Lab #1, Wood Identification	10%
• Lab #2, Material Porosity	10%
• Lab #3, Mortar Analysis	10%
• Lab #4, Paint Analysis	10%
• Lab #5, Remediation	10%
• <u>Historic Structures Report &amp; Presentation</u>	<u>30%</u>
	<b>100%</b>

**X. Honor Code:**

You are expected to follow this, no exceptions. All graded assignment should be pledged and signed. Please see me if you have any questions regarding what is and is not considered plagiarism or cheating.

**XI. Classroom Behavior:**

Students **ARE** expected to participate in class discussions and lectures as well as treat both the teacher and students respectfully. All cell phones should be turned off and absolutely no text messaging, twittering or blogging. Furthermore, students should conduct themselves in a manner that promotes a good learning environment by refraining from actions that might disrupt the class. Some examples, although not exhaustive, of inappropriate behavior include sleeping during class, talking during class, loud outbursts, reading the newspaper, the use of profanity, and showing up to class intoxicated. I reserve the right to excuse students from class for failure to follow these rules or in any instance where I feel their behavior or failure to prepare for class or labs endangers themselves or others. Unfortunately it has become necessary at the college level to seriously enforce these rules, **YOU WILL NOT BE GIVEN A SECOND CHANCE.**

**XII. Office of Disability Services:**

The Office of Disability Services has been designated by the University as the primary office to guide, counsel, and assist students with disabilities. If you receive services through that office and require accommodations for this class, please make an appointment with me as soon as possible to discuss your approved accommodation needs. Bring your accommodation letter with you to the appointment. The information you share with me will be held in the strictest confidence. If you need other accommodations (note taking, etc.) please contact the Office of Disability Services at (540) 654-1266, they will require documentation of a disability.

### XIII. Class Schedule:

Date	Subject	Homework/Readings (due on date listed)	Assignments/Exams (due on date listed)	Other
8/23	<b><u>Syllabus Review and Setting Classroom Standards</u></b>	Review HISP 305, structures, structural systems, loads, etc.		
8/25	<b><u>Defining Building Forensics</u></b>	“How Buildings Learn” pg 1-51 (blackboard) “Building Pathology” pg 1-8		
8/30	<b><u>The Historic Structures Report (HSR) and Formatting</u></b>	Preservation Brief #35 all (online) Preservation Brief #43 all (online)		
9/1	<b><u>Producing an HSR</u></b> Preliminary Walkthrough	“Building Pathology” pg 9-40, 74-93.	<i>Introduction of Buildings for HSR and HSR assignment distributed</i>	
9/6		Wear old clothes, bring cameras & field book.		Site visit (MW House)
9/8	Using Measured Drawings & Photographs in Building Forensics			
9/13		Wear old clothes, bring cameras & field book.		Site visit (MW House)
9/15	Archival Research: Finding, Compiling, Analyzing and Interpreting		<i>Archival Project Assigned</i>	
9/20		We will visit the following places: Rappahannock Regional Library, Fredericksburg Archives Collection, HFFI		Site visit (meet at Lewis Store)
9/22	<b><u>Existing Conditions</u></b> Identifying Structural Systems and Failures/ Sampling/ Testing Protocols	“Building Pathology” pg 96-186. “Identifying Wood” pg 90-94 (blackboard)		
9/27		Wear old clothes, bring cameras & field book.		Site Visit (MW House)

9/29	Nondestructive Investigations	Silman, "Applications of Non-Destructive Evaluation Techniques in Historic Buildings" (blackboard) Bradshaw, "Condition Assessment of Timber Bridges: Evaluation of a micro-drilling Resistance Tool" (blackboard)		
10/4		Wear old clothes, bring cameras & field book.		Site Visit (MW House)
10/6	Identifying Materials and Material Deterioration (Timber)	"Building Pathology" pg 40-45 "Conserving Buildings" pg 13-57 (blackboard)		
10/11	<b><u>Fall Break</u></b>	<b><u>No Class</u></b>		
10/13		Review 305 material on wood Lab Handout "Identifying Wood" pg. 69-89 (blackboard)	<i>Archival Assignment due</i>	Lab #1 in Wood Identification
10/18	Identifying Materials and Material Deterioration (Stone & Ceramics)	"Building Pathology" pg 48-61. "Conserving Buildings" pg 58-83, 99-132. (blackboard)		
10/20		Lab Handout	<i>Lab #1 due</i>	Lab #2 in Porosity
10/25	Identifying Materials and Material Deterioration (Binders & Concrete)	"Building Pathology" pg 61-65. "Conserving Buildings" pg 133-160 (blackboard)		
10/27	Meeting place and time TBD	Lab Handout	<i>Lab #2 due</i>	Lab #3 in Mortar Analysis
11/1	Identifying Materials and Material Deterioration (Metals)	"Building Pathology" pg 65-71. "Conserving Buildings" pg 175-215. (blackboard)		
11/3	Identifying Materials and Material Deterioration (Glass & Paint)	"Building Pathology" pg 71-72 "Conserving Buildings" pg 216-238. (blackboard)		
11/8		Lab Handout	<i>Lab #3 due</i>	Lab #4 in Paint Analysis
11/10	Evaluation of Significance, Future Use, Treatment Options and Conservation Approach	"Building Pathology" pg 237-273. "Secretary of Interior's Standards for Rehabilitation", "Secretary of Interior's Standards for Restoration", Skim the guidelines for both rehabilitation and restoration. (online)		



11/15	Remediation and Recommendations	Readings Pertaining to specific issues identified, TBA		
11/17		Lab Handout (specific to issues identified)	<b><i>Lab #4 due</i></b>	Lab #5 in Remediation
11/22		Wear old clothes, bring cameras & field book.		Site Visit (MW House or Rising Sun)
11/24	<b><u>Thanksgiving Break</u></b>	<b><u>No Class</u></b>		
11/29		Wear old clothes, bring cameras & field book.	<b><i>Lab #5 due</i></b>	Site Visit (MW House or Rising Sun)
12/1		Wear old clothes, bring cameras & field book.		Site Visit (MW House or Rising Sun)
12/6	<b><u>Final Exam (HSR due and Presentation)</u></b> @ 3:30-6:00 pm		<b><i>Final Exam (HSR due and Presentation)</i></b>	