



HSPV 738-301: Conservation Seminar: Wood

Spring 2021 Tuesday 6-9 pm Virtual
Instructor: Andrew Fearon afearon@design.upenn.edu cell 917-450-6113
TA: TBD

Course Description:

Prior to the twentieth century, most structures found in the built environment relied upon wood as a primary material for both structural members and decorative features. An understanding of the physical properties as well as the historic application of this organic material provides the basis for formulating solutions for a wide spectrum of conservation issues. As the scope of preserving wooden structures and wooden architectural elements is continually broadened, new methods and technology available to the conservator together allow for an evolving program – one that is dependent upon both consistent review of treatments and more in-depth study of craft traditions. This course seeks to illustrate and address material problems typically encountered by stewards of wooden built heritage – among them structural assessment, bio-deterioration, stabilization and replication techniques. Through a series of lectures and hands-on workshops given by representative professionals from the fields of wood science, conservation, entomology, engineering, and archaeology, theoretical and practical approaches to retaining wooden materials will be examined with the goal to inform the decision making process of future practicing professionals.

Course Requirements:

As a seminar, all students are expected to participate equally beginning with attendance of all lectures, laboratories and site visits. Required reading will be assigned on a weekly basis and posted in the course folder in preparation for lectures. Three short quizzes will help students commit concepts to memory as well as allow the instructor to quantify the effectiveness of the coursework. Students will have ample time to submit quizzes and shall work in teams of two to complete them. Research projects will be assigned to groups of the same two students as part of the 2021 seminar's virtual format. A final research paper will be submitted at the end of the semester. A one paragraph progress report of the research with questions are to be submitted via email by Sunday 5pm each week. All work must follow the universities standards for academic integrity listed at the following link: http://www.upenn.edu/academicintegrity/ai_codeofacademicintegrity.html

Grading Summary:

Attendance 30 %

Quiz One – Wood Identification and Physical Properties 15 %

Quiz Two – Historic Construction of Wooden Materials 15 %

Quiz Three- Wood Conservation Methodologies and Treatment 15 %

Research Paper 25 %

Course Schedule:

#1 1/26/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Course Overview

Andrew Fearon, (*Chief Architectural Conservator*, Materials Conservation, Philadelphia) will provide a seminar overview with discussion of class reading materials, quizzes, and grading.

#2 2/2/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Wood: Chemical Composition to Macro-structure with Basic Identification Techniques

An introduction to wood species, growth and structure examined on a macro-scale will be explored through an interactive lecture. Extraction and preparation of samples from architectural fragments will be demonstrated. Use of stereoscopes, compound microscopes and surfacing techniques will be exercised.

#3 2/9/21 Lecture 6pm Suzana Radivojevic, PhD, *Wood Scientist*

Wood Anatomy and Pathology: Deterioration and Micro-structure with Advanced Identification Techniques

An overview of wood microstructure and related anatomical features used in identification will be presented. Abiotic and biotic deterioration agent mechanisms as they affect wood composition both chemically and structurally will be explored with guest lecturer Suzana Radivojevic.

Quiz One Posted - Wood Identification and Physical Properties

Research Topic Submission due Sunday February 14th at 5 pm

#4 2/16/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Conservation of Exterior Architectural Wood

The condition assessment of exterior woodwork as part of a building's maintenance cycle with related treatment formulation will be presented through case studies. Decay fungi identification, preservative systems, replication repair, conservation fill materials and techniques, glazing, paint and exterior coatings will be discussed.

#5 2/23/21 Independent Group Meetings

Research Outline Submission (Table of Contents) due Sunday February 28th at 5pm

#6 3/2/21 Lecture 6pm Ron Anthony, *Wood Scientist*

Wood Diagnostics: Technology and In Situ Evaluation of Timber

An overview of diagnostic technologies for assessing wooden structures will be presented and evaluated by guest lecturer Ron Anthony. In-situ applications of resistograph drilling, thermography and moisture content mapping will be compared by quantitative and qualitative attributes. A tutorial on the practice of in-situ grading will follow.

Quiz One due Sunday March 7th at 5pm

#7 3/9/21 Lecture 6pm Richard Ortega, PE, AIA, FAPT, *Engineer / Architect*

Timber Structures: Construction, Structural Assessment and Intervention

Guest lecturer Richard Ortega will present on structural design, analysis, and evaluation of timber structures for the purpose of rehabilitation. Traditional wood construction including anatomy of the timber frame will be discussed including related case studies of structural interventions. Methods of diagnostics and traditional repairs vs. introduction of steel components will be illustrated.

#8 3/16/21 Lecture 2pm Mikel Landa, PhD, *Architect*

Conservation of Wooden Built Heritage: Methodology and Practice

From the documentation and analysis of wooden construction systems to the heritage management of cultural landscapes, guest lecturer Mikel Landa will share his experience as a heritage conservation professional and specialist in wooden architecture. Incorporating global perspectives on authenticity, integrity and related theory for intervention, presented case studies will illustrate methodology and technical solutions applied in the conservation of wooden built heritage.

Quiz Two Posted – Historic Construction of Wooden Materials

Research Papers (50 % Draft Submission) due Sunday March 21st 5pm

#9 3/23/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Insects and Wooden Materials

The primary wood destroying insect species typically encountered in wooden built heritage will be identified. The importance of Integrated Pest Management (IPM) in termite control, including the inspection, treatment of termites, and monitoring baiting programs vs. liquid chemical eradication will be discussed. Methods for identifying evidence of carpenter bees, carpenter ants, powder-post beetles, examining challenges and species behavior will be illustrated with a collection of hand-held specimens.

Quiz Two due Sunday March 28th 5pm

#10 3/30/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Conservation of Interior Architectural Woodwork

The conservation of interior woodwork including investigation, environmental monitoring analysis and treatment will be presented through case studies. An interactive lab will follow with demonstrations of period natural resin finishes and cleaning formulation. An ultra-violet light demonstration will be conducted to identify and distinguish coatings on architectural fragments and prepared samples.

#11 4/6/21 Lecture 6pm Andrew Fearon, *Architectural Conservator*

Wood, Archaeology and Forensics

A survey of past and current approaches to the treatment of archaeological wood will be covered providing an understanding of wooden materials in the most fragile of conditions. Investigation techniques such as the application of wood fastener chronologies will be illustrated in detail. Wood forensic analysis incorporating various technology derived diagnostic features will be illustrated through an examination of Arthur Koehler's 1930s investigation of evidence used to convict Bruno Hauptmann in the Lindbergh Kidnapping Case.

#12 4/13/21 Lecture 2pm Coralie Mills, PhD, *Dendrochronologist*

Dendrochronology: Technology and Application

An overview of the principles and processes of dendrochronology as they are applied to built heritage will be presented through case studies of Scotland by guest lecturer Coralie Mills.

Quiz Three Posted - Wood Conservation Methodologies and Treatment

#13 4/20/21 Independent Group Meetings

Research Papers (90 % Draft Submission) due Sunday April 25th 5pm

#14 4/27/21 **Final Presentation of Research Projects**

Reports 100% Final Submission of Practicum Project Reports due May 10th 5pm

Quiz Three due May 12th 5pm