**HIPR 6510, Cross-listed as ARCH 6351**

**Building Conservation**

**Credit Hours:** 3

**Time:** Friday

**Place:** Historic Building Types & Methods, 2) Issues of Sustainability in Building Conservation, 3) Field and Lab Methods of Building Assessment, and 4) the Professional Management of Building Rehabilitation. The course takes an integrative approach to the scientific, aesthetic, managerial and professional dimensions of preservation.

**Instructor:** Short

**Office:** Suite 300

**Home Office:** 3.585.1903

**E-Mail:** MELANIE.SHORT@UCDENVER.EDU

**Office hours:** Friday 8:30-9:30

**Course Objectives:**

**Building Assessment -- Field and Lab Methods:**

- Understand the differences between assessment, surveying, monitoring, and testing and when each is appropriate.
- Understand issues around lab and field safety, physical properties of historic materials, and deterioration mechanisms.
- Understand the basic techniques of scientific field and laboratory investigation and analysis for the following historic building materials: Masonry (brick and stone), Wood, and Paint.
- Acquire experience in inferring information from historic buildings and records pertaining to them.

**Historic Building Types and Methods:**

- Understand the structure and systems of older buildings including the results and effects of technological change, and how buildings and materials age.
- Understand materials used in the construction of historic buildings and how they differ from those used in contemporary construction.
- Acquire experience in recognizing typical 19th and 20th C. construction types and preservation issues related to them.

**Issues of Code Upgrades and Sustainability in Building Conservation**

- Understand contemporary policy debate on the energy efficiency and sustainability of the heritage “building stock”
- Understand standards and codes: Model building and energy codes; LEED criteria; alternative measures.
- Understand analytical concepts of embodied energy and life cycle analysis as they apply to preservation.
- Understand typical inherent sustainable features of historic structures

**Professional Management of Building Rehabilitation:**

- Understand the role of the members of the project team: architect, owner, conservator, engineer, contractor, archaeologist, building inspectors, and craftsperson.
- Understand various institutions and standards and their roles in implementing the findings of various preservation values. This includes the Secretary of the Interiors Standards for the Treatment of Historic Buildings as well as other standards.
- Understand construction management issues of historic preservation
- Acquire experience in how to design and specify a repair and or replacement program.

**Required Texts:**

**Highly Recommended Texts:**
Gale, Frances Editor *Preservation Technology Primer: Readings from the APT* bulletin Association for Preservation Technology International Springfield, IL 2008

**Attendance, assignments and grading policy:**
**Attendance and participation in class**
- Class meets weekly so attendance is very important
- Productive participation in class discussions is highly desirable. Be prepared to answer and ask questions based on weekly topics and present information to your classmates.
- Unexcused absences beyond two class periods or field session will reduce the final grade by 1/3 of a grade for each additional absence. Absences should be pre-approved by the lecturer.
- 15% of the final grade is for class attendance and participation.

**Assignments**
Written assignments must be submitted at the beginning of class on the scheduled due date. Late assignments will be penalized 3 points for each week late. Work should be submitted in Canvas.

**Exterior Condition Assessment**
- Choose a building on campus, either on the 9th street historic mall, one of the churches or another building 50 years or older. First come first serve, but only one student will be able to work on each building, so choose early and choose wisely.
- Photograph the building and be prepared to present a 5 minute powerpoint presentation to the class on your selected building materials, conditions and recommendations.
- Describe the exterior materials and architectural features of your selected building. Assigned readings should be referenced for proper terminology and date/period identification. Footnote your sources. At least the main façade of large buildings should be described, all facades if the building is accessible. It is not expected that you will need to access the interior or climb on the roof for this assignment.
- Describe the condition of these materials and assign each material a condition per History Colorado’s State Historical Fund Annotated Scope of Work for Historic Structure Assessments with the exception of interior and HVAC/electrical issues. Be prepared to present a 5 minute presentation on the materials and conditions assessed. Submit a rough draft based on field investigation, observations and causes of deterioration.
- Provide recommendations for treatment, ongoing maintenance or further investigation as appropriate using Preservation Briefs and other readings as resource material. Make adjustments per comments received from instructor’s review of the draft report. Be
prepared to present a 5 minute presentation on the recommended treatment options and why they were chosen.

- Submit a final report, annotated with the photographs taken.
- 20% of the final grade for final report. This will be a semester long project.

**Worksheets on Readings**

- Five questions related to readings for the week in short essay form will be provided in class.
- 5% of final grade

**Mid Term Exam**

- Take home essay exam
- Select 3 of 5 topics selected by the instructor.
- Exam will be worth 25% of final grade

**Final Poster Presentation**

- Final poster shall be presented to invited guests, instructors and classmates. The final research summary shall be submitted to the instructor along with the printed poster.
- Students will be asked to select one of five possible topics for research as selected by instructor. Possible types of research include, but are not limited to case studies, literature reviews, material and technology studies, new technology and its application to historic structures.
- Post a 500 word abstract of your approach to the topic to Canvas. Each student is required to comment on two other students’ presentation topics. Prepare to present your abstract to the class.
- Possible information sources for case studies include personal experience from a project with which you are involved, access to individuals involved in the profession, and previously published case studies.
- For literature reviews, available research on the chosen topic should be reviewed and summarized. Analysis of further needs and investigations should be included.
- Material and technology studies could include hands-on demonstrations or a poster illustrating a process such as the use of wood epoxies and fillers for the restoration of historic windows or the use of appropriate patching material on stone masonry.
- New technology and its application could include hands-on demonstrations or a poster illustrating the development of the technology, its intended applications (if not for historic structures), and how it is being or could be used in the building conservation field.
- Poster and research summary will be worth 35% of final grade

**Grading**

- 15% of the final grade is for class attendance and participation.
- 20% of the final grade is for the exterior assessment
- 5 % for worksheets on readings.
- Mid-term exam will be worth 25% of final grade
- Poster and research summary will be worth 35% of final grade
- Unexcused absences beyond two class periods or field session will reduce the final grade by 1/3 of a grade for each additional absence.
- Late assignments will be penalized 3 points for each week late.
Grades are determined using an absolute scale. Total possible points for the semester are 100. Each percentage point listed above is worth a point, point ranges for grades are 100-88-A range, 87-75-B range, 74-62 C range, 61-50 D range, below 50 is a failing grade.

**Student Policies:**

**Academic Honesty**
- Plagiarism is the use of another person’s words or ideas without crediting that person. Plagiarism and cheating will not be tolerated and may lead to failure on an assignment, in the class, and dismissal from the University. (Refer to School/College guidelines.)
- You are responsible for being attentive to or observant of campus policies about academic honesty as stated in the University’s Student Conduct Code. (http://thunder1.cudenver.edu/studentlife/studentlife/discipline.html)

**Access, Disability, Communication**
- The University of Colorado at Denver and Health Sciences Center is committed to providing reasonable accommodation and access to programs and services to persons with disabilities. Students with disabilities who want academic accommodations must register with Disability Resources and Services (DRS), 177 Arts Building, 303-556-3450, TTY 303-556-4766

**Course Communication**
- In addition to announcements made and written handouts distributed in class, I may need to contact you between classes, which I'll do through individual and group email messages. You are responsible for any messages, including assignments and schedule changes, I send you via canvas. You also may contact me via email, in addition to seeing me during office hours.

**Civility**
- Turn OFF cell phones during class. Adherence to the Student Conduct Code is expected. If you text during class, you will be asked to leave. The midterm will be based on lecture topics, as will the poster presentation, so attendance will be crucial to success. You will have breaks during class to check in, if there is an emergency situation requiring your phone to remain on please inform the instructor prior to class.
- My commitment is to create a climate for learning characterized by respect for each other and the contributions each person makes to class. I ask that you make a similar commitment.

**Students called for military duty**
- If you are a student in the military with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact your school/college Associate Dean or Advising Office immediately.”
## Unit 1 – Building Assessment – Field and Lab Methods

<table>
<thead>
<tr>
<th>Week - Topic</th>
<th>Agenda</th>
<th>Readings / Assignments</th>
<th>Tour</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 22 - Week 1 – Introduction;</td>
<td>Introduction and Syllabus review; Logistics and expectations</td>
<td>None for this class</td>
<td><strong>Campus Tour</strong></td>
<td>Short</td>
</tr>
<tr>
<td>the various institutions, their</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standards, and their roles in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>implementing the findings of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>various preservation values.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 29 - Week 2 - The historic</td>
<td>HSR components and the annotated scope of work for Historic Structure</td>
<td>Preservation Briefs 17 and 18</td>
<td>None for this class</td>
<td>Short</td>
</tr>
<tr>
<td>structures report (HSR) and its</td>
<td>Assessments</td>
<td>Waite, Palazzo and Jenkins “Watching the Evidence; An HSR to Guide the Preservation of George Washington’s Mount Vernon” (APT primer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>variants</td>
<td></td>
<td>Chapter 1 and Appendix A Young</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>DUE TODAY: SUBMIT BUILDING CHOICE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 5 - Week 3 – CPI conference</td>
<td>Please attend the CPI conference if possible</td>
<td>Preservation Briefs 35</td>
<td>None for this class</td>
<td>Short</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silman “Applications of non-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week - Topic</td>
<td>Agenda</td>
<td>Readings / Assignments</td>
<td>Tour</td>
<td>Instructors</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Feb 12 - Week 4</td>
<td>Case Studies: Field investigation and how to determine what was built when.</td>
<td>Stockbridge “Crack Evaluation and Monitoring” (APT primer)</td>
<td>Campus tour</td>
<td>Short</td>
</tr>
<tr>
<td></td>
<td>Class Presentation on building – 5 minute powerpoint</td>
<td>Preservation Brief 43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Feb 19 - Week 5      | Case Studies: Water infiltration at foundations, walls, windows, roofing and flashing conditions | Preservation Brief 39 Weber and Johnson “Investigative techniques for water penetration” (APT primer) Gale “Measurement of water absorption” (APT primer) | None for this class | Short       |
|                      |                                                                                                 |                                                              |          |             |

**Unit 2: Historic Building Types and Methods**
| Week 6 – Masonry structures | their relative affect on water migration issues, thermal mass issues, stress and deformation of the mass wall, mortar issues  
Case Studies: Tivoli Student Union | 1 and 2  
*Chapters 5 and 6*  
Young  
Blades “Training the Trades for Masonry Preservation” (APT Primer)  
**DUE TODAY:**  
*Condition of building exterior materials* | Student Union |
| --- | --- | --- | --- |
| Mar 4 -Week 7 – Frame and heavy timber structures | Wood frame structures and heavy timber, grading of existing structure in place, wood species identification and structural analysis of light frame timber buildings  
**Class Presentation on Recommendations– 5 minute powerpoint** | Preservation brief 10 and 20  
Anthony “Condition Assessment of Timber…” (APT Primer)  
*Chapter 4* Young  
**DUE TODAY:**  
*Recommendations* | None for this class | Short |
| Mar 11-Week 8- Metals | Steel, Copper, Cast Iron and Wrought Iron characteristics, methods of deterioration and means of restoration and repair  
**Preservation Briefs 13 & 27**  
*Chapter 7* Young  
“Statue of Liberty: Systems within a structure of Metal” APT bulletin; Cliver  
**DUE TODAY:**  
*Abstract for Final Poster Presentation* | **Campus tour** | Short |
| Mar 18- Week 9- The building | Case Studies – Empire State Bldg envelope replacement, issues of  
Preservation Briefs 03, 16 and 47 | None for this class | Short |
<table>
<thead>
<tr>
<th>envelope and the role of glass, insulation and coatings on the building.</th>
<th>insulating masonry walls and appropriate coatings for various materials including wood and masonry</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIDTERM PRESENTED</td>
<td>Chapter 9 Young Schwartz “Glass and Metal Curtain-Wall Fundamentals” (APT Primer)</td>
</tr>
<tr>
<td></td>
<td>DUE TODAY: Final exterior assessment report due</td>
</tr>
</tbody>
</table>

SPRING BREAK MARCH 21-27 NO CLASS
<table>
<thead>
<tr>
<th>Week - Topic</th>
<th>Agenda</th>
<th>Readings / Assignments</th>
<th>Tour</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1 - Week 10 - Traditional building systems and inherent sustainable features of historic buildings. - field session of case study of historic LEED certified buildings in Denver, Colorado</td>
<td>Introduction to LEED and sustainable preservation issues and opportunities.</td>
<td>Preservation Brief 3 and 24 Chapter 22 Young View GEO webinar</td>
<td>Engine House No. 5</td>
<td>Short</td>
</tr>
<tr>
<td>April 8 - Week 11 – Energy inputs: utilities, environmental controls, LEED issues, life cycle costing, embodied energy and the Energy code as it applies to historic structures</td>
<td>Case studies: How was the building meant to work, what have we done to it to lessen the comfort, vernacular designs to take best advantage of regional microclimates</td>
<td>Preservation Brief 9 and 13 Jackson “Emodied Energy and historic preservation: A needed reassessment” (APT primer) Chapter 19, 20 and 21 Young</td>
<td>Emerson School</td>
<td>Short</td>
</tr>
<tr>
<td>April 15 - Week 12 – Code related issues in continued use and reuse: field session of case studies of historic code upgraded buildings in Denver.</td>
<td>Introduction of IEBC and the alteration levels</td>
<td>Preservation Brief 41 and 32 Alderson and Artim “Fire-Safety Retrofitting: innovative solutions for ornamental building”</td>
<td>None for this class</td>
<td>Short</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Case Study</td>
<td>Due Today</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>April 23 -</td>
<td>Week 13 - The role of the members of the project team: architect, owner, conservator, engineer, contractor, craftsperson.</td>
<td>Case Study: Union Station and the role of project managers, architects, contractors, and the community in the redevelopment of an iconic transit structure.</td>
<td>DUE TODAY: Interim Poster submittal peer review.</td>
<td></td>
</tr>
<tr>
<td>April 29 -</td>
<td>Week 14 - Construction management issues of historic preservation</td>
<td>Small group break out session with each student taking on a role in a redevelopment project.</td>
<td>Union Station DUE TODAY: Rough draft of poster presentation due – bibliography and research summary final.</td>
<td></td>
</tr>
<tr>
<td>May 6 -</td>
<td>Week 15 - How to design and specify a rehabilitation project – paint analysis</td>
<td>Introduction to specifications specific to rehabilitation projects - review drawings and</td>
<td>None for this class.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specifications: 013510 Special Procedures for Historic Treatment 030130 Maintenance of Cast-in-Place concrete 040120 Maintenance of Unit Masonry</td>
<td>None for this class.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short.</td>
<td></td>
</tr>
<tr>
<td>Specifications</td>
<td>05911 Treatment of historic ornamental cast iron</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>069100 Exterior Woodwork Rehabilitation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>080152.93 Historic Treatment of Wood Windows</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>090190 Maintenance of Painting and Coatings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| May 13 - Week 16 – Finals week                      | Student presentation of Poster presentations     |
|                                                   | **DUE TODAY:** Poster Presentations              |
|                                                   | None for this class                              | Short  |