

CHEM 100: Light at the Museum – the Science and Art of Conservation Fall 2022

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Class Meetings: MW 2 – 3:20 pm and F 2 – 2:50 pm, ISC 1111, we will occasionally meet in a different location (Muscarelle Museum of Art, Swem Library, Museums of Colonial Williamsburg, and Collections and Conservation Building at Colonial Williamsburg) – see schedule

Office Hours: F 1 – 2 pm and by appointment
(Zoom option @ Meeting ID: 998 3889 2049; museum)



Course Description

“Every day, the vision of artists, the identity of peoples, and the very existence of history all threaten to disappear. Left alone, old buildings will crumble. The Declaration of Independence will disintegrate. The photographed faces of battle-weary Civil War soldiers will fade away...”

–American Institute of Conservation

By melding science with art, conservation professionals protect and preserve the physical artifacts of our cultural heritage. How are science and art used to slow or prevent deterioration? What can science tell us about art? What can art tell us about science? How does experimentation lead to knowledge and innovation in both the scientific and artistic domains? We will examine these questions by investigating the materials and technology used in creating and conserving art. You will engage in the course material through reading, writing, meeting with guest speakers, delivering presentations, as well as visits to museums and conservation labs. In this COLL 100 course, you will be challenged to think rigorously, and to develop communication skills beyond the written word. Over the course of the semester you will build the knowledge and skills necessary to create a presentation to the class on a museum object. In this presentation, you will analyze the results of a technical examination and their bearing on the artwork itself as well as describe how the artwork informs science. Class meetings will be a mixture of discussion, lecture, in-class activities, workshops, trips, and student presentations.

This course has two broad goals:

- To introduce you to the field of painting conservation and the ways in which experimentation (in both the artistic and scientific sense) can lead to innovation.
- To provide opportunities for you to collaborate with peers on assignments and projects that model real-world practice in the museum setting, with an emphasis on non-written communication.

Learning Objectives

After completing this course – as an active partner in learning, communicating, and creating – you will be able to:

- Describe the materials that are used to create easel paintings.
- Understand and explain the light-matter interactions that are important in the creation, visualization, and deterioration of paintings.
- Demonstrate, discuss, and assess the scientific methods that are used by conservation professionals to study paintings.

- Examine and explain the ways in which artistic experimentation leads to scientific innovation.
- Locate and evaluate sources for your conservation research project.
- Apply your knowledge of artists' materials and modern scientific techniques to examine a current problem in painting conservation.
- Create and deliver presentations that communicate effectively your knowledge of conservation and how science and art are used together to examine a painting.

Required Reading

Required reading assignments will be posted on Blackboard and come from the following sources:

- Kirsch, A.; Levenson, R. *Seeing through Paintings: Physical Examination in Art Historical Studies*; Yale University Press: New Haven, 2002.
- Shlain, L.; *Art & Physics: Parallel Visions in Space, Time, and Light*; HarperCollins Publishers: New York, 1991.
- Mills, J.; White, R.; *Organic Chemistry of Museum Objects*; Butterworth-Heinemann Series: New York, 2011.
- Journal articles in *National Gallery Technical Bulletin*, *Studies in Conservation*, *Heritage Science*

Assessment

Research Project (60%): The main assignment in this course is a semester-long research project where you will build the knowledge and skills necessary to create a presentation to the class on a museum object. In this final presentation you will explain, interpret, and analyze the results of a technical examination and their bearing on the artwork itself (e.g., historical significance, attribution). Research presentations will also describe how the painting (e.g., the materials and methods used in its creation or conservation) has led to new knowledge in science. Project milestones are set up throughout the semester to help you understand your topic as well as build the skills necessary to communicate your findings to the class. These milestones include both individual and group assignments as follows:

- Presentation 1 (A Material): Individuals deliver a 1–2 min. presentation (1 slide) on a painting material that uses information and images from reputable sources. (20 pts)
- Annotated Bibliography: Investigate a painting that interests you during a research workshop with Swem Library. Submit a brief rationale of your choice (~1 paragraph) that explains why you are drawn to the material together with an annotated bibliography of the key sources you plan to use. (30 pts)
- Create and Revise a Slide: Individuals will create draft slides for their second presentation and groups will review and revise the slides during a workshop. (20 pts)
- Presentation 2 (One Aspect of Technical Analysis): Working with a small group, deliver a 5–7 min. presentation (~2-3 slides) summarizing a scholarly article on a technical examination of a painting of your choosing. Presentations should focus on *one aspect* of the technical examination. (40 pts)
- Group Annotated Bibliography: In preparation for the final presentation, groups will submit an annotated bibliography of *at least* three scholarly articles from the literature on the full technical examination of a specific painting and complementary information on the painter, artists' material, and/or scientific method. (60 pts)
- Peer Review: Each student will critically evaluate a final presentation. Peer reviews are due by 12 pm on the day following the workshop. (20 pts)
- Final Presentation (Full Technical Examination): Working with a small group, create and deliver a 20 min. presentation (5+ slides) that explains, interprets, and analyzes

the results of a technical examination of a painting and their bearing on the artwork itself. Presentations will also explain how one aspect of the artwork (e.g., a painting material, method, style, etc.) is connected to scientific innovation. (80 pts)

We will begin the series of presentation assignments by viewing online presentation resources and discussing the features of a high-quality presentation. Teams of students will use workshops to develop presentation skills (e.g., volume, pace, eye contact, etc.) and then work toward slide design and story development using Jean-Luc Doumont's online resources. As a class, we will use group observations to develop a rubric that will guide the creation and evaluation of the presentations. Detailed information about the individual components of the research project including general instructions, grading criteria, and opportunities for revision will be distributed and discussed in class.

Quizzes (15% each): Two quizzes will assess your understanding of the scientific concepts presented in the class and museum settings. Quizzes are open note and handout, but using additional resources (e.g., Blackboard, books, the internet, other students, etc.) is not permitted. The second quiz will include content from the final presentations.

Participation & Activities (10%): Your engagement during class is crucial in this course and is expected to receive full credit. Full participation includes coming to class prepared, asking and answering questions, sharing in discussion, collaborating and communicating effectively with your peers, completing in-class activities, delivering presentations, and supporting the classroom technology and community engagement policies. Several in-class activities and homework assignments that assist your preparation for class discussion, quizzes, presentations, and your meetings with librarians, visits to the museum will be given throughout the semester. They will be graded with a 0 (incomplete/missed), 1 (satisfactory), or 2 (exceptional). Please note that due dates for these shorter assignments are not always included on the syllabus – they will be discussed in class and/or posted to Blackboard in advance. Activities are typically due at the end of class.

Credit Hours. COLL 100 courses normally meet for 3 hours per week and students receive 4 credits as compensation for greater expectations for outside work on presentations. We will meet on several Fridays (2-2:50 pm) to prepare for presentations. Other Fridays are reserved time for groups to gather outside of class to work on projects.

Grades

Grading rubrics for each element of the research project will be discussed and posted on Blackboard in advance of the assignment deadline. In some cases, we will discuss and establish specific grading criteria together. A final grade of C- or better is required to fulfill the COLL 100 requirement. In general, final grades will be established with a typical grade scale (A = 100-93, A- = 92-90, B+ = 89-87, B = 86-83, B- = 82-80, etc.). Final letter grades are assigned based on demonstrated understanding and/or mastery of the materials and skills as well as growth.

Class Climate & Group Work

This course is designed to give you opportunities to explore topics in conservation science through instruction, discussion, and collaboration. Together we will create and maintain an atmosphere of mutual respect in which everyone's ideas can be heard. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class. All group members are expected to contribute equally, though perhaps differently, to group work. It is your responsibility to

communicate with your group members and/or me should any issues arise. I will gladly honor your request to address you by your name and pronouns, please tell me if I have made a mistake.

Policies

Classroom

Every one of you contributes to the learning environment of this class through your presence, your questions and discussion points, and the energy you bring to the room. Technology can enhance the learning environment when you use it to seek additional information or document an activity. However, technology can also distract you and those around you to the point that it destroys our learning environment. Accordingly, the use of laptops, tablets, and phones for texting, social media, email, and web browsing unrelated to class is prohibited – especially during class visits to museums and conservation labs. Inappropriate use of technology will result in a substantial reduction in your participation and/or final grade. If you are feeling unwell, please do not attend class.

Late Work & Attendance

Due to the highly structured and scaffolded nature of this course, late submission of materials is typically not permitted. Two class absences for any reason are excused without penalty (including any corresponding activities), but to pass the class, your attendance at the presentations (individual, group, practice, and final) is mandatory. Additional unexcused class absences may lead to a grade-letter reduction in your participation and/or final grade. Exceptions to these policies will be at the instructor's discretion in consultation with the Dean of Students Office (757-221-2510, deanofstudents@wm.edu). I am prepared to be flexible with these policies to a reasonable degree for religious accommodations or if you are significantly impacted by other extenuating circumstances.

Honor Code

The student Honor Code is an important part of what makes William & Mary a special community. I expect you to observe the Honor Code fully and faithfully.

Writing Resource Center

The Writing Resources Center, located on the first floor of Swem Library, is a free service provided to William & Mary students. Trained consultants offer individual assistance with writing, presentation, and other communication assignments across disciplines and at any stage, from generating ideas to polishing a final product. Students are encouraged to make use of this free resource. To make an appointment, visit: www.wm.edu/wrc

Student Accessibility Services

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see www.wm.edu/sas

Approximate Course Schedule:*

Week of	Topics	Material	Key Dates & Activities
8/31	Conservation: Where Art & Science Meet	Seeing through Paintings (STP), Chpt. 1 (pp. 1-4)	9/2: Meet at Muscarelle Museum of Art**
9/5	The Support & X-Radiography	Shlain, Chpt. 1 (pp. 15-27); STP, Chpt. 2 (pp. 5-44)	9/5: No class 9/7: Discuss Shlain reading** 9/9: Discuss Presentation 1
9/12	The Support & X-Radiography	STP, Chpt. 2 (pp. 5-44)	9/12: Add/drop deadline 9/14: Information literacy workshop with Swem librarian for Presentation 1 9/16: No meeting, watch Lily Lamboy videos
9/19	The Ground & Imaging	Lily Lamboy videos	9/19: Presentation 1 workshop** 9/21: Visit to Museums of Colonial Williamsburg**
9/26	The Paint Layer	STP, Chpt. 4 (pp. 101-144)	9/26: Presentation 1
10/3	Chemical Origins of Color	STP, Chpt. 4 (pp. 101-144)	10/3: Research and citation workshop at Swem (Ford) for Presentation 2
10/10	Examining the Paint Layer	Lab handout	10/10: Annotated bibliography for Presentation 2 due 10/14 – 10/15: Fall break
10/17	Fluorescence & UV Imaging	Jean-luc Doumont, <i>Creating Effective Slides</i>	10/17: Quiz 1 10/19: Create & revise a slide due, workshop
10/24	Presentation 2	Handout	10/24-10/26: Presentation 2 10/28: Self & group evaluation due
10/31	Advanced Techniques; SERS Identification of Fugitive Pigments (Model Presentation 3)	Shlain, Chpt. 8; <i>Analytical Chemistry</i> article	10/31: Withdraw deadline; Discuss readings 11/2: Workshop

11/7	Advanced Techniques; Case Studies at Conservation Lab	Handout	11/7: Meet at conservation lab** 11/9: Annotated bibliography assignment #2 due; presentation 3 workshop
11/14	Presentation Workshop: Practice & Revision		11/14: Presentation workshop 11/16 – 11/18: Practice presentations (peer reviews due 12 pm next day)
11/21	<i>No class – Thanksgiving Break (11/21 for remote Presentation 3 revision and practice)</i>		
11/28	Final Presentations		11/28: Presentation workshop 11/30 – 12/1: Presentation 3 (content included on Quiz 2)
12/5	Course Wrap Up & Reflection		12/5: Self & group eval due 12/7: Quiz 2 12/9: Meet at museum (TBD)

**Any changes to this course schedule will be announced in class or via Blackboard. Due dates for shorter in-class or homework assignments are not always included – they will be announced in advance. If a Friday class meeting is not listed, that time is reserved for you to work independently on class projects.*

***Assignment due at the end of class*

Additional Resources

Research Guide for *Light at the Museum* (Science Librarian, Swem Library):

<https://guides.libraries.wm.edu/lightatthemuseum>

Lily Lamboy, Speaking to Connect, Workshop Videos 1 – 7 (@RTTPOfficialVideos playlist):

https://www.youtube.com/playlist?list=PLZlvZ6ST7_ff4tux-gjrWK7c-rcJK5ZoK ;Intro, Eye Contact, Tone, Gestures, Volume, Fluency, Pacing

Jean-luc Doumont, Creative Effective Slides video and more available at:

<https://www.youtube.com/watch?v=meBXuTIPJQk>

OSC: *Open Stax Chemistry*, by Flowers, Theopold, and Langley

<https://openstax.org/details/books/chemistry>

OSP: *Open Stax College Physics*, by Urone and Hinrichs

<https://openstax.org/details/books/college-physics>