Chem. 201: Color, Light, & Chemistry
Fall 2018
Prof. Elizabeth J. Harbron

Instructor
Prof. Elizabeth J. Harbron, ISC 2047, ejharb@wm.edu (email is the best way to get in touch with me)

Class and Lab Meetings

Tuesdays	2 – 3:20 pm	ISC 3280 (classroom)
Thursdays	2 – 3:20 pm	ISC 3280
	3:30 – 4:50 pm	ISC 2056 or 2060 (lab)

Tuesday sessions will consist of discussions, lectures, student presentations, and demonstrations. Thursday sessions will combine these elements with hands-on lab activities and group work.

Office Hours
Wednesdays 3:30 – 4:30 pm ISC 2047 (other hours are available by appointment, please email)

Required Course Materials

- Amy Butler Greenfield, *A Perfect Red,* ISBN: 9780060522766. *Other required readings will be distributed in class and/or on Blackboard*
- Chemical splash goggles must be worn during all labs and may be purchased in the bookstore. **Please note that shoes that cover the entire foot and clothing that covers the shoulders, torso, and legs are required in the lab.**

Course Description
Color, Light, & Chemistry will use the theme of color and light to weave a narrative through basic concepts in chemistry. The course will be grounded in the Natural World and Quantitative Reasoning (NQR) domain as it explores the process of scientific discovery through reading, discussion, and hands-on experiments. Students will develop their understanding of the foundations of chemistry through the color and light theme. As a COLL 200 course, Color, Light, & Chemistry will also look outward to the Arts, Letters, and Values (ALV) domain by placing chemistry into the broader context of art, art history, and culture. Connections to the Cultures, Societies, and the Individual (CSI) domain will be made through discussions of dye industry, economics, artifact analysis, and world trade. This course will give students the opportunity to put methodologies represented in the course into practice through hands-on experiments, demonstrations, and a color story research project.

Assessment

30%	Color story research project
20%	Midterm exam
20%	Final exam
15%	Lab and homework worksheets
15%	Participation (including in-class exercises)

Color story research project. You will complete a semester-long research project that focuses on a major discovery or application of color chemistry. Project milestones are set up throughout the semester to help you define and understand your topic as well as demonstrate the relevant chemistry in the lab. These milestones include proposing your research topic, planning and conducting a laboratory experiment, and designing an effective presentation with complementary visual aids. Projects will culminate in a group presentation that must teach the class some new chemistry (NQR) and integrate knowledge from the CSI and/or ALV domains. The overarching goals of the research project are to: 1) understand new chemistry through the lens of your color story and 2) make coherent and meaningful interconnections across the academic domains (NQR, CSI, and ALV) to create a compelling color story. Detailed information about the research project will be distributed in class and on Blackboard.

Exams. The midterm and final exam will test understanding of the scientific concepts presented in both the class and lab settings and are the primary means by which mastery of the basic ideas and methods of the NQR domain will be assessed. Cultural and historical content from *A Perfect Red* and the Color Story presentations will also be covered on exams.

Labs. Labs enable you to put NQR methodologies represented in the course intro practice. Labs will be accompanied by a worksheet on which you record observations and answer questions. Worksheets will typically be due at the end of the class period in which the experiment is conducted.

Homework. Three homework assignments that assist your preparation for class discussion of *A Perfect Red* will be given. It will be helpful for you to review the assignment prior to reading the designated book sections. Additional short homework assignments will be given throughout the course

Participation. Your engagement during class and lab is expected. Full participation includes coming to class and lab prepared, asking and answering questions, sharing in discussion, fully engaging in labs, working effectively with lab and project partners, delivering presentations, and completing in-class exercises.

Final Grades
The final class scores and grades will be scaled with the following considerations:

A = Excellent performance and mastery of the material
B = Very good understanding of the material
C = Adequate performance
D = Poor performance
F = Unsatisfactory performance

Absence Policy
This course embraces an active learning environment in which full participation in group activities, in-class exercises, group presentations, labs, and discussions is vital to the learning experience. One class absence that results in a missed in-class exercise will be excused without penalty. Additional class absences resulting in a missed in-class exercise will result in a score of 0 for the exercise and a reduction in the participation grade. Late work will not generally be accepted. Due to the constraints of shared lab space, make-up labs are not possible. One absence from a lab for any reason will be excused without penalty. Additional lab absences will result in a score of 0 for the lab and a reduction in the participation grade. Students must complete 4 or more labs and all group experiments and presentations to pass the course. Any 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).

Classroom Technology Policy
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 a lab experiment. However, technology can also distract you and those around you to the point that it destroys our carefully crafted learning environment. Accordingly, use of laptops, tablets, and phones for texting, social media, email, and web browsing unrelated to class is prohibited. Inappropriate use of technology will result in a reduction in the participation grade.

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

Accessibility
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 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation.

Chem. 201 Class Schedule

Dates	Topics	Readings	Lab Activities	Key Dates
Aug. 30	introductions LC: measuring light & color	OSP 24.3		
Sept. 4 Sept. 6	LC: additive color mixing, light-object interactions	PA p. 82-87, 92-97, 99-100, 103-106	***Lab 1:*** Additive Color Mixing (Tues.) ***Lab 2:*** Subtractive Color Mixing (Thurs.)	9/7: add/drop period ends
Sept. 11 Sept. 13	LC: subtractive color mixing MC: bridge to matter	PA p. 118-121, 125-127	Intro to CS topics	9/13: pigment timeline HW due
Sept. 18 Sept. 20	MC: atoms – from color to bonding	OSC 2.3–2.5, 6.4, 7.1–7.3 APR prologue – Ch. 5	***Lab 3:*** Pigment Synthesis	9/18: APR homework #1 due 9/20: CS topic rationales due
Sept. 25 Sept. 27	MC: organic bonding, draw like a chemist	OSC 7.1 – 7.2	***CS Experiment #1***	9/27: upload Expt #1 notes to BB
Oct. 2 Oct. 4	chemistry review, MC: color and conjugation	OSC 7.4 APR Ch. 6	***Lab 4:*** Color and Conjugation	10/4: APR homework #2 due 10/4: CS annotated bibliography due
Oct. 9 Oct. 11	midterm exam CS: scientific method & experimental design	APR Ch. 10-12	CS groups work on Experiment #2 design	10/9: midterm exam 10/11: APR homework #3 due
FALL BREAK – no class Oct. 16				
Oct. 18	MC: intermolecular interactions	OSC 10.1	***Lab 5:*** Indigo Dyeing	10/18: CS Experiment #2 plan due
Oct. 23 Oct. 25	MC: finish intermolecular interactions, organic functional groups		CS groups work on building synopses	10/26: last day to withdraw
Oct. 30 Nov. 1	CS: presentation skills		***CS Experiment #2***	10/30: CS revised Expt #2 plan due (if necessary) 11/1: presentation HW due & upload Expt #2 notes to BB
Nov. 6 Nov. 8	CS: acid-base interactions, intro to fibers	OSC 14.1 + BB reading	CS groups finalize synopses	11/8: CS synopsis due
Nov. 13 Nov. 15	CS: dye-fiber interactions, intro to fluorescence		***Lab 6:*** Dye-Fiber Interactions	
Nov. 20	CS: fluorescence applications		no lab - Thanksgiving	11/20: CS slides due
THANKSGIVING BREAK – no class Nov. 22				
Nov. 27 Nov. 29	CS: fluorescence applications		CS presentation boot camp	
Dec. 4 Dec. 6	CS: color story presentations		CS presentations	12/7: final CS slides uploaded by noon
Dec. 19	Final Exam on Tuesday, Dec. 19, 2 pm			

Abbreviations

LC: Light & Color MC: Matter & Color CS: Color Story BB: Blackboard

OSP: *Open Stax College Physics*, Urone and Hinrichs, https://openstax.org/details/books/college-physics

OSC: *Open Stax Chemistry*, Flowers, Theopold, and Langley, https://openstax.org/details/books/chemistry

PA: *Physics in the Arts*, Gilbert and Haeberli

APR: *A Perfect Red*, Butler Greenfield