

ARCH A6764
Wednesdays & Fridays 1:30-4:00 or 6:00 PM
Spring 2015

Basic Conservation Science
Norman Weiss & George Wheeler

Description

This course presents the basic principles of conservation science of architectural materials and serves as the foundation for subsequent material-based conservation courses such as: 1. Architectural Metals, 2. Concrete, Cast Stone and Mortar, 3. Brick, Terra Cotta and Stone, 4. Architectural Finishes in America, and, 5. Wood. The first two lectures focus on developing the fundamental scientific language for the study of inorganic materials that are explored in the following weeks through lectures, demonstrations, and laboratories. The pattern is repeated for organic materials later in the semester: two lectures on fundamental scientific language followed by lectures, demonstrations and laboratories on paint, clear finishes and wood.

Readings and Assignments

Readings, laboratory instructions and assignments for each class are posted to the *Shared Files* folder in *CourseWorks*. Readings are in preparation for the listed class, and, on occasion, a short quiz based on the readings will be given at the beginning of class.

Grades

Attendance & class participation	20%
Assignments/Quizzes	20%
Laboratory Reports	20%
Examinations	40%

Schedule

21 January	Class 1	Lecture: Periodic Table; elements & chemical symbols; oxidation numbers; ions, cations & anions; chemical formulas; chemical equations & related symbols
23 January	Class 2	Lecture: molecular mass (weight) & molarity; other expressions of concentration; saturation; pH & acids, bases & salts; electronegativities; bond & compound types
28 January	Class 3	Lecture: metallic bonding; conductivity; density, opacity & lustre; alloys; processing
30 January	Class 4	Laboratory: metal identification using XRF, microchemical testing & physical properties
4 February	Class 5	Lecture: electrode potentials & corrosion/protection of metals
6 February	Class 6	Lecture: mechanical properties of architectural materials
11 February	Class 7	Laboratory: preparation of mortars
13 February	Class 8	Laboratory: densities of architectural materials
18 February	Class 9	Lecture: the lime “cycles”; carbonation vs. hydration; cement chemistry
20 February	Class 10	Laboratory: mortar characterization – acid digestion
25 February	Class 11	Lecture: aggregates & additives; concrete – pH & alkalinity
27 February	Class 12	Lecture: water absorption techniques, porosity & permeability

4 March	Class 13	Lecture: rock/stone mineralogy & rock identification
6 March	Class 14	Laboratory: x-ray diffraction of stone, mortar, & salts
7,8 March	Class 15	Laboratory: polarizing light microscopy, mineral & rock identification, microscopy & chemistry of mortars
11 March	Class 16	Laboratory: compatibility of mortars & substrates
13 March	Class 17	IN CLASS EXAMINATION
25 March	Class 18	Lecture: organic bond types; chemical groupings & basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials
27 March	Class 19	Lecture: basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials, continued
1 April	Class 20	Lecture: basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials, continued
3 April	Class 21	Lecture: paint terminology, film thickness, mechanisms of film formation Laboratory: hiding power & refractive index
8 April	Class 22	Lecture: pigments & pigment identification
10 April	Class 23	Laboratory: pigments & pigment identification
15 April	Class 24	Lecture/Demonstration: colorimetry
17 April	Class 25	NO CLASS: STUDENT CONFERENCE: University of Delaware
22 April	Class 26	Laboratory/Demonstration: identification of paint media & clear coatings
24 April	Class 27	Lecture: wood chemistry & properties
29 April	Class 28	Lecture: wood treatments
1 May	Class 29	IN CLASS EXAMINATION