ARCH A6764 **Basic Conservation Science**
Wednesdays & Fridays 1:30-4:00 or 6:00 PM **Norman Weiss & George Wheeler**
Spring 2014

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

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

5 March	Class 13	Laboratory: compatibility of mortars & substrates
7 March	Class 14	Laboratory: compatibility of mortars & substrates, continued
8,9 March	Class 15	Laboratory: polarizing light microscopy, mineral and rock identification, microscopy and chemistry of mortars
12 March	Class 16	NO CLASS: TAKE-HOME EXAMINATION
14 March	Class 17	NO CLASS: TAKE HOME EXAMINATION
26 March	Class 18	Laboratory: x-ray diffraction of stone, mortar, and salts
28 March	Class 19	Lecture: organic bond types; chemical groupings & basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials
2 April	Class 20	Lecture: basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials, continued
4 April	Class 21	Lecture: basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials, continued
9 April	Class 22	NO CLASS: STUDENT CONFERENCE IN BUFFALO
11 April	Class 23	NO CLASS: STUDENT CONFERENCE IN BUFFALO
16 April	Class 24	Lecture: paint terminology, film thickness, mechanisms of film formation Laboratory: hiding power & refractive index
18 April	Class 25	Lecture and Laboratory: pigments and pigment identification
23 April	Class 26	Lecture and Laboratory: colorimetry
25 April	Class 27	Laboratory/Demonstration: identification of paint media and clear coatings
30 April	Class 28	Lecture: wood chemistry and properties
2 May	Class 29	IN CLASS EXAMINATION