

**ARCH497/597f: Construction Laboratory**  
**Professor Mary Hardin Rammed Earth/Compressed Earth Workshop**  
1233 Fremont Lab, 2-3 credits

**School of Architecture, CALA**  
**University of Arizona**

**COURSE DESCRIPTION:**

A laboratory course focusing on materials, craftsmanship, tools, safety, tectonic theories, programmatic and functional requirements of designing, detailing and constructing full scale furniture, buildings, or building components.

This section is a hands-on research and experimentation session that will construct a series of full-scale mock-ups of rammed earth and compressed earth blocks to determine aesthetic and structural variables. The research will be incorporated into the construction of a rammed earth or compressed earth residence by a subsequent class.

Prerequisites: None; at least fourth year standing in professional program suggested

Teaching Format: lecture/discussion, an occasional field trip and hands-on shop or field work.

**INSTRUCTOR:**

Mary Hardin:

Contact: School of Architecture Rm. 310, 621-6742, mchardin@u.arizona.edu

**COURSE OBJECTIVES**

This course will enable the students to gain knowledge of specific topic areas and apply and test that knowledge in a specific situation with the design, detailing, and construction of a full-scale project. The objectives for this section are:

- A brief analytical examination of rammed earth and compressed earth block precedents
- An understanding of the basic construction methods used for rammed earth and compressed earth block
- An exploration of the aesthetic and structural characteristics of rammed earth and compressed earth block
- An awareness of the code and technical requirements of rammed earth and compressed earth block
- Ability to communicate with technical drawings and specifications necessary for actual construction
- Ability to follow safety procedures for the use of all tools necessary for completion of course projects

**NAAB PERFORMANCE CRITERIA:**

The National Architectural Accrediting Board identifies 37 performance criteria it determines to “constitute the minimum requirements for meeting the demands of an internship leading to registration for practice”. The criteria which all sections of this course address are indicated in the box at the upper right corner of page one of this syllabus. Individual sections may add further performance criteria. More information on accreditation and a list of the performance criteria can be found on NAAB’s web site at: <http://www.naab.org>.

**COURSE TOPICS AND STRUCTURE**

Lectures and demonstrations will explain the theoretical, programmatic and tectonic goals of the course project, which then will be understood through the process of making. All lectures, discussions, and demonstrations will occur in the shop or field during class time. Students will choose two from the projects offered. Projects will require additional time outside of class time.

**ASSIGNMENTS:**

Student work will consist of in-class exercises that will be continued outside of class, as well as a sketch journal. Field trips or assignments requiring drawings are required. Trips will be completed during class time unless prior arrangements have been made. Graduate students will be assigned managerial tasks in addition to the two required projects and journal. They will serve as team leaders, scribes, and accountants for each project. The graduate students will be responsible for the integration of all research determinations into a desktop publication that documents the projects.

**REQUIREMENTS**

Project A

Students will choose one of the following projects:

- To discover special shapes, bevels, chamfers, and reveals that can be achieved in the rammed earth.
- To determine pigment additives that will achieve desired colors for rammed earth walls.
- To discover how objects might be embedded and revealed in surface of rammed earth walls.
- To determine a soil/cement mix that will achieve the compressive strength required by rammed earth code.
- To invent formwork refinements necessary to allow a discontinuous concrete bond beam to be poured at top of form.

Project B

Students will choose one of the following projects:

- To determine the configuration of the bond beam atop a compressed earth block wall and design the appropriate formwork.
- To determine the method of connecting frame walls and glazing to compressed earth block walls

- To determine a method of embedding load-bearing fasteners into compressed earth block walls and experiment with embedding other objects
- To determine a recipe and method for plastering one side of a compressed earth block wall with cement-based as well as lime-based plaster.
- To determine the type of joint finishing that will be employed in the compressed earth block wall.

Team documentation of each project  
Journal: notebook and photo/sketch record of research process  
Graduate Students will document the body of research information

**READINGS**

Easton, David. The Rammed Earth House.  
McHenry, Paul Graham. Adobe and Rammed Earth Buildings : design and construction  
Neubauer, L. W. Adobe Construction Methods: Using Adobe Brick or Rammed Earth (monolithic construction).  
Smith, Edward W. Adobe, Pressed-Earth, and Rammed-earth Industries in New Mexico  
Tibbets, Joseph M. The Earthbuilders' Encyclopedia.  
Clough, Richard Hudson. A Qualitative Comparison of Rammed Earth and Sun-dried Adobe Brick.

**TOOLS**

Tape measure, gloves, torpedo level.

**POLICIES**

**Attendance:**

Attendance is required. More than one unexcused absence will be grounds for withdrawal or failure at the discretion of the instructor.

**Grading:**

*Undergraduate Students:*

Project A – 40%

Project B – 40%

Journal – 20%

*Graduate Students:*

Project A – 35%

Project B – 35%

Journal – 15%

Managerial tasks and Documentation – 15%

Final grades will be based on the following:

<u>Grade</u>	<u>points</u>
A	90-100
B	80-89
C	70-79
D	60-69
E	59 or below

**Late Work**

Late work will result in grade reduction of one letter grade per day late.

**Incomplete Work**

Incomplete work will not be accepted without instructor's prior approval and written agreement as to revised due dates and grading policy.

**STATEMENTS**

**Subject to Change**

With the exception of the grade and attendance policies, parts of this syllabus are subject to change with advance notice, as deemed appropriate by the instructor.

**Handicapped Accessibility**

Every effort will be made to accommodate students with diagnosed disabilities. Please contact the instructor to initiate a discussion about how we can best help you succeed in this class.

**Retention of Work**

The School of Architecture has the right to retain any student project whether it be for display, accreditation, documentation or any other educational or legal purpose.

**ACADEMIC POLICIES**

Academic policies for this course can be found in *The University of Arizona 1999-2000 General Academic Catalog* (<http://catalog.arizona.edu/catalog1999/>). Refer specifically to the section titled "Code of Academic Integrity" for the principles, policies and procedures governing issues of academic integrity. More detailed information can be found at <http://w3.arizona.edu/~studpubs/handbook/policyframe.html>, or in the Dean of Students office, Rm. 203 Old Main.