Construction I

Washington Dulles International Airport by Eero Saarinen, 1962 - Rebar Cages during Construction
Overview

General Information

University of Texas at Austin School of Architecture

Schedule:  
Tuesdays | Lecture 8:00am – 9:30am  
Thursdays | Lecture 8:00am – 9:30am  
Fridays | Lab 9:00am – 12:00pm

Location:  GOL 3.120

Instructor:  Aleksandra Jaeschke, email: jaeschke@austin.utexas.edu
Teaching Assistants:  Amaya J Lucas, email: ajlucas@utexas.edu  
Jayme Gritch, email: jgritch@utexas.edu

Office Hours:  By appointment
E-mails:  Please, begin subject line of all class-related e-mails with: “Construction I: “

Prerequisites  
The following coursework with a grade of at least C in each: Architectural Interior Design 310L  
and 311L, or Architecture 310L and 311L; and registration for Architectural Interior Design 320K  
or Architecture 320D (or 320K).

Summary  
Construction I is a broad introduction to materials, systems, methods of manufacturing and  
assembly of buildings and their components, as well as various aspects of the trade of building  
and its socio-cultural and environmental impacts. Part of a series of four required courses, it is  
meant for students of architecture, interior design, and historic preservation.
Overview

Course Agenda

“The builder is indispensable. In fact, the project for a building is not really complete if it does not consider how it will be built, and the ways in which a building can be built have a notable power of inspiration. All viable new structures are intimately related to construction methods, and these methods are visible in the finished building.”


construction (kon-strük’shan) n.
- the act or process of constructing;
- the art, trade, or work of building; an engineer trained in highway construction; worked in construction for years.
- a structure, such as a building, framework, or model;
- something fashioned or devised systematically;
- the way in which something is built or put together: a shelter of simple construction;
- (grammar) an arrangement of words forming a grammatical phrase, clause, or sentence.

construct (kon-strukt’) tr.v.
- to form by assembling or combining parts; build;
- to create (an argument or a sentence, for example) by systematically arranging ideas or terms;
- (mathematics) to draw (a geometric figure) that meets specific requirements.

Objectives

The term “construction” comes from the Latin word constructio, which itself has roots in com- "together" and struere "to pile up”. A significant portion of this course will focus on struere. We will examine materials, building elements, and systems that they form, or "pile up" into. Still, it will be equally important to investigate the ways in which these elements come together thanks to active and at times messy human-machine interactions and legal frameworks. We will look into how these interactions transform architectural projects into buildings, but also, and inevitably turn a seemingly exact and stable body of knowledge into a fascinating and ever-changing material practice. The practice of constructing buildings.

The main objective of this course is to help you become familiar with the commonly-used materials and established construction practices. Yet, the course will hopefully also help you acquire an appreciation for the open nature of the act of building, along with an awareness of its reliance on material resources, and socio-economic and cultural circumstances.

Construction is an important trade and a powerful expression of human ingenuity. Yet, it is also tightly interconnected with the natural world. It depends on available material resources and natural dynamics. At the same time, it affects environments and communities from which we extract these resources and to which we return wastes. Acquiring an understanding and an
appreciation for these material interdependencies and environmental repercussions is one way to approach architecture as an ethically-driven material practice. Similarly, developing an intimate knowledge of materials and methods of construction can potentially become a way to creatively push the boundaries of architecture. That is, if we accept that architecture is essentially a material practice. While this course will not teach you everything you need to know about construction, it will hopefully reveal some of its richness and convince you to stay curious.

Structure
Two lecture sessions each week will include instructor presentations preceded by a brief quiz on the assigned reading material and followed by a short question period. The course is divided into three interconnected thematic blocks:

- The first part - Components and Systems focuses on the most common building materials and construction systems, and examines their origins, forms, properties, methods of manufacturing and assembly, as well as their applications.
- The second part - Modalities focuses on the various aspects of the trade of building, and examines how buildings are put together, responsibilities distributed, goals communicated, and risks contained and regulated.
- The last part of the course – Repercussions concentrates on the broad socio-cultural impacts of construction, examining it as an expression of local/global economies, enabler of human well-being, culprit of environmental degradation, and last but not least, a powerful channel for creative expression.

In addition, the students are required to attend the Friday lab sessions and complete assigned readings. The laboratory sessions will be dedicated to field trips to manufacturing plants and/or construction sites, group research and design projects, and a few in-class exercises. Participation in the Friday sessions is compulsory.

The readings will be distributed in advance and are meant to help students better comprehend the issues discussed during the lectures. They will be essential in the preparation for the exams and open-book tasks. In other words, you will not be able to exclusively rely on the lectures to successfully complete this course.

Assessment
Students are expected to participate in all activities and comply with all the requirements for the length of the semester. There are four components to the grade:

Exams: closed-book, in-class exams 50% of final grade
Two closed-book exams will test students’ ability to recall factual material and apply practical knowledge. Comprised of approx. 20 questions, the exams will require short answer, drawing, and diagramming. Except as required by University policies, make-up exams will not be offered.

Homework: open-book homework 20% of final grade
Two open-book research tasks will challenge students to reflect upon and apply knowledge learned during the first two parts of the course: 1. Components and Systems & 2. Modalities. Comprised of approx.
10 questions, the tasks will require short answer, drawing, and diagramming, and will be announced in advance and distributed after a Thursday lecture to be returned at the beginning of the following Thursday session. Late work will not be accepted.

**Lab Work:** projects, exercises, quizzes 30% of final grade

Short quizzes will be distributed at the beginning of most of the sessions to test students’ comprehension of the material discussed during the previous lecture. Lab exercises and projects will require research, drawing, diagraming, and making during and outside lab time and will be announced as the semester progresses.
Overview

Course Road Map

01 | August 28
Introduction – Definitions, modes of inquiry
Lab 00 | August 30 No Lab – Watch assigned documentaries

Block 01: Components and Systems

02 | September 03
Materials – Sites of extraction, modalities of transformation
03 | September 05
Building Blocks - Grains, blocks, studs, panels, etc.
Lab 01 | September 06 Materials & Building Blocks – Research project

04 | September 10
Construction Systems - Assemblies and modalities of classification
05 | September 12
Aggregates - Concrete, rammed earth, etc.
Lab 02 | September 13 Field Trip - Destination TBC

06 | September 17
Masonry - Stone, brick, etc.
07 | September 19
Wood - Heavy timber, lightweight frame, etc.
Lab 03 | September 20 Construction Systems – Case study analysis

08 | September 24
Metal - Steel, aluminum, etc.
09 | September 26
Glass and Plastics
Lab 04 | September 27 Brick Workshop – Design development

10 | October 01
Brick workshop - student presentations
11 | October 03
Brick workshop - student build day
Lab 05 | October 04 Construction Systems – Design exercise

12 | October 08
Ground - Site hydrology, geology, and topography: Foundations
13 | October 10
Skin - Climate control and energy: Envelopes, roofs, and mechanical systems
Lab 06 | October 11 Field Trip - Destination TBC

14 | October 15
Skeleton - Stability: Load-bearing structures
15 | October 17
Integration - Multi-performance systems
Lab 07 | October 18 Environmental performance - Design exercise

16 | October 22
Mid-term Exam
Block 02: Modalities

17 | October 24  Assembly and fabrication methods
    Lab 08 | October 25  Harlen Miller, UNStudio - ACADIA lecture
18 | October 29  Logistics - Transport of materials and sequencing of work
19 | October 31  Modalities of production - Manual labor, human-machine interactions, and robotics
    Lab 09 | November 01  Field Trip - Destination TBC
20 | November 05  Knowledge networks - Users, designers, managers, and makers
21 | November 07  Regulatory frameworks - Zoning ordinances, building codes, and industry standards
    Lab 10 | November 08  Building Codes - Exercise
22 | November 12  Communication - Graphic standards and BIM
23 | November 14  Context - Regional knowledge and global networks
    Lab 11 | November 15  Studio Project – Materials choices and construction details

Block 03: Repercussions

24 | November 19  Experience - Well-being, pleasure, productivity
25 | November 21  Impact - Environments, resources, and communities
    Lab 12 | November 22  Studio Project – Graphic standards of communication
26 | November 26  Conclusions - Construction as a form of expression
00 | November 28  Thanksgiving – No Class
    Lab 00 | November 29  Thanksgiving – No Lab
00 | December 03  Final Reviews – No Class
00 | December 05  Final Reviews – No Class
    Lab 00 | December 06  Final Reviews - No Lab
27 | December 12  Final Exam

Please, note that the distribution of lecture topics and lab content may change. The exam dates will remain unvaried.
Resources

Required Textbook


Manuals & References


Ramsey, Charles George, and Harold Reeve Sleeper. *Architectural Graphic Standards, 11th ed.*, Wiley & Sons, 2010*


Gordon, J. E. *Structures, Or Why Things Don’t Fall Down*. Da Capo Press, 2009*


Resources

Critical Texts

Balmond, Cecil. *Informal*. Prestel, c2002

* Texts available in electronic version using the UT ID.
Please, note that additional required and recommended readings will be announced in class and posted to canvas as the semester progresses
Evaluation & Policies

General Culture
Being on time is required. Participation is expected. Asking questions is highly encouraged. We want to have an open and engaging conversation and a productive time. Use of phones and laptops is not allowed during lectures. Eating in class is distracting and disrespectful. Drinks are fine, stay hydrated! Please, step out if you have to make an emergency call.

Communication & Submissions: Canvas & Emails
Canvas will be used for communication of the logistics and content of the course, as well as for submission of assignments, feedback, grading, and attendance. Direct emails will be used for one-to-one communication.
Please, set up your Canvas preferences to receive an email (or text message) notification as soon as a Canvas Announcement has been posted online. Make sure that the email you provided on Canvas is active and that you regularly check your inbox.

Field Trip Conduct
Field trips to construction sites and/or building material manufacturing operations will occur both during lecture and lab sessions. For these field trips, you must wear long pants, closed-toe shoes, and bring hard hats and safety glasses (which will be provided by the school). Punctuality and responsible on-site conduct are essential to the continued success of the visits and your safety.

Evaluation Criteria
Grades are subject to deductions for late arrivals, absences, and late or incomplete work at the discretion of the instructor. Group work requires equal participation from all members. Any individual not performing a commensurate share of the work may be eliminated from the group, but still responsible for satisfaction of the assignment requirements. A student must earn a letter grade of C or better in order for the course to count towards a degree in the School of Architecture and to progress in to the next studio. A letter grade of C- will not satisfy degree requirements.

Grade Description
- A/A- Excellent
  Project surpasses expectations in terms of inventiveness, appropriateness, visual language, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class. Project is complete on all levels.
- B+/B/B- Above Average
  Project is thorough, well presented, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. Project is complete on all levels and demonstrates potential for excellence.
• C+/C  Average
  Project meets the minimum requirements. Suggestions made in class and not pursued with dedication and rigor.
  Project is incomplete in one or more areas.

• C-/D+/D/D-  Poor
  Project is incomplete. Basic grasp of skill is lacking, visual clarity or logic of presentation are not level-appropriate.
  Student does not demonstrate the required competence and knowledge base.

• F  Fail
  Project is unresolved. Minimum objectives are not met. Performance is not acceptable. Note that this grade will be
  assigned when students have excessive unexcused absences.

• X  Excused Incomplete
  Can be given only for legitimate reasons of illness or family emergency. Simply not completing work on time is not
  an adequate cause for assigning this evaluation. It may only be used after consultation with the Associate Deans’
  offices and with an agreement as to a new completion date. Work must be completed before the second week of
  the next semester in which the student is enrolling, according to the School of Architecture policy.

Attendance
Attendance is mandatory. Participation is expected. With three (3) unexcused absences, the student’s final grade for the
course will be lowered by a full letter grade. The final grade will be lowered by a full letter grade for each unexcused absence
thereafter. Aside from religious observances, absences are only excused with written documentation of a medical issue or
family emergency. The student is responsible for completing work missed due to excused absences and initiating
communication with the instructor to determine due dates. If a student is late (10 minutes after the start of class) three (3)
times, it will be counted as one (1) unexcused absence. Students should notify the instructor via email prior to class if lateness
or absence is known in advance.

Religious Observances
A student shall be excused from attending classes of other required activities, including examinations, for the observance of
a religious holy day, including travel for the purpose. A student whose absence is excused under this subsection may not be
penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is
excused within a reasonable time after the absence. University policy requires students to notify each of their instructors as
far in advance of the absence as possible so that arrangements can be made.

Academic Integrity
Students who violate University policy on academic integrity are subject to disciplinary penalties, including the possibility of
failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the
integrity of the University, policies on academic integrity will be strictly enforced. Refer to the Student Conduct and
Academic Integrity website for official University policies and procedures on academic integrity:
http://catalog.utexas.edu/general-information/the-university/#universitycodeofconduct

Care Program

Counselors in Academic Residence (CARE) Program places licensed mental health professionals within the colleges or schools they serve in order to provide better access to mental health support for students who are struggling emotionally and/or academically. Abby Simpson is the CARE counselor for the School of Architecture. Faculty and staff may refer students to the CARE counselor or students may directly reach out to her.
Abby Simpson | BTL 114B | (512) 471-3115
https://cmhc.utexas.edu/CARE_simpson.html

Students with Disabilities

Students with disabilities who require special accommodations need to obtain a letter that documents the disability from the Services for Students with Disabilities area of the Office of the Dean of Students (471-6259 voice or 471-4641 TTY for users who are deaf or hard of hearing). This letter should be presented to the instructor in each course at the beginning of the semester and accommodations needed should be discussed at that time. http://diversity.utexas.edu/disability/