MATERIALS AND METHODS
FUNDAMENTALS OF BUILDING DESIGN AND CONSTRUCTION

"The unknown is the province of the student; it is the field for his life’s adventure" ... “a large volume of adventures may be grasped within this little span of life, by him who interests his heart in everything.”

-- Lincoln Steffens (American Journalist) and Laurence Sterne (English Writer) respectively

arch 3007  fall 2013  course syllabus

Louisiana State University
Professor William J. Doran, Assoc. AIA
51 Atkinson Hall, wdoran@lsu.edu
Office hours by appointment

Lecture: T,TH 3:00 - 4:20 PM; 313 Design

LSU General Catalogue description: ARCH 3007 (3)
Prereq.: approval for advancement to upper division in architecture. Detailed treatment of construction materials and systems, with emphasis on large scale application of enclosure systems and steel and concrete structures.

introduction

As the famous saying goes, “...if you give a man a fish he is hungry again in an hour; if you teach him to catch a fish you do him a good turn.”1 Due to the ever-evolving nature of building technology and the ever-increasing flux and variety of projects, clients, codes and site conditions, architects are constantly confronted with new bodies of information and new processes that must be quickly understood and successfully navigated. Successful, practicing architects develop a vast repertoire of building vocabulary, principles and construction techniques over many years of practice by learning through doing. More importantly though, they establish methods for accessing, organizing and applying that information to solve problems in the very real business of making buildings. Engaging this second, more critical skill in the classroom is necessary to prepare students for the profession. This course will use group work and problem-solving exercises in building technology that go beyond the traditional lecture format. You will establish and actively engage processes for accessing, organizing and applying information gathered from textbooks and note-taking. You will have the opportunity to develop the tools necessary to approach new, unknown bodies of information with comfort, confidence and creativity – essential traits for competent leaders in the practice of architecture today.
learning objectives

1. Develop a competent and creative mindset for approaching building design and construction.
   - Establish a beginning, working knowledge of materials, building systems and construction methods.
   - Establish a comfortable, accessible process for understanding and applying new, complex systems.
   - Establish a continuous dialogue between two-dimensional representation and three-dimensional objects.
   - Engage real-world materials, processes and construction sites first hand.

2. Understand the broad context of the design and construction industry.
   - Establish a basic knowledge of building and construction history. Why do we build?
   - Identify key relationships between persons and entities involved in making buildings.
   - Identify and interpret the implications of site, climate, materials and codes on the built environment.

   - Develop a beginning construction vocabulary.
   - Identify materials and components in relationship to drawn and built building assemblies.
   - Distinguish between correct and incorrect uses of materials and components.

4. Understand basic principles and appropriate application of structural assemblies and enclosure systems.
   - Identify and categorize major structural and enclosure systems and their constituent components.
   - Explain how various components of structural systems carry loads to the ground and resist lateral forces.
   - Explain how enclosure systems prevent/protect against water and air infiltration and heat gain/loss.

5. Analyze and apply contemporary structural assemblies and building envelope systems.
   - Produce detailed two-dimensional drawings of basic building assemblies.
   - Convert non-technical information into a technically precise description and document for purposes of review and construction.

6. Effectively participate in a group work.
   - Use group discussion to decipher, analyze, and formulate questions, ideas and solutions.
   - Identify personal skills that will maximize the group's ability to complete assignments.

7. Understand the potential of materials and methods to communicate ideas.
   - Interpret how creation/selection of materials and systems might be expressive of design intentions.
   - Compare examples of specific assemblies in this regard.

course layout (see calendar)

The semester is broken down into three major components. The first will frame building construction and the practice of architecture in context to its history, regulatory practices and the building site. The second component focuses on major building structural systems - wood, steel, concrete and masonry - with emphasis on material characteristics and fabrication, standard practices and assemblies, and sustainable and innovative applications. And finally, we will move to the outermost and innermost layers of the building enclosure - from roofing and cladding to openings, insulation, air-sealing and water-proofing.
# course layout + tentative schedule (subject to change)

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texts

Required:
- Allen, Edward and Iano, Joseph. Fundamentals of Building Construction
- Ching, Francis. Building Construction Illustrated

Required readings will be taken from the following sources and provided on course Moodle:
- Crawford, Matthew B., Shop Class as Soulcraft
- Willis, Daniel. The Emerald City and Other Essays on the Architectural Imagination

Other recommended resources:
- Allen, Edward and Iano, Joseph. The Architect’s Studio Companion
- Deplazes, Andrea (Ed.). Constructing Architecture: Materials, Processes, Structures
- Ramsey/Sleeper. Architectural Graphic Standards: Student Ed.
- Taunton Press. For Pros By Pros: Measuring, Marking and Laying Out, A Builder’s Guide
- Taunton Press. For Pros By Pros: Foundations and Concrete Work
- Taunton Press. For Pros By Pros: Precision Framing
- Taunton Press. Build Like a Pro: Windows and Doors
- Taunton Press. Build Like a Pro: Insulate and Weatherize

course evaluation

At the conclusion of this course the student should have completed the following:
- Homework and quizzes related to course material throughout semester (number to be determined.)
- Field exercises and trips to construction sites and manufacturing facilities (number to be determined)
- Two (2) group research exercises/presentations
- Two (2) exams

Course grades will be based on the following percentages. Grades will be given at the completion of each assignment. Individual participation, class and lecture series attendance, discussions, and timeliness and completion of assignments will be evaluated as part of your professionalism grade.

- Professionalism 5%
- Homework, quizzes and exercises 25%
- Group Research Project 1 12%
- Group Research Project 2 18%
- Midterm Exam 15%
- Final Exam 25%
grading policy

Simple completion of the required work does not guarantee a C, acceptable mastery of the course material. The following definitions of letter grades are from the University General Catalog.

A  Distinguished mastery of the course material
B  Good mastery of course material
C  Acceptable mastery of course material
D  Minimally acceptable achievement
F  Failing

Assignments not turned in on time will automatically lose one whole letter grade. Any deadline missed that is not discussed with the instructor by the following class period will result in a zero (0) for the given assignment.

attendance requirements

Attendance is expected for the scheduled duration of the class session. More than three unexcused absences may constitute grounds for placement on attendance probation (see PS-22 Student Absence General Policy). Since most class meetings or general discussions will take place at the beginning of the class period, it is important that all students be in the room promptly at the beginning of class. Arriving late or leaving early, unless authorized by the instructor, will be considered unprofessional behavior and will affect your professionalism grade. Expected attendance is from 3:10 - 4:30 PM on Tuesdays and Thursdays. All research, gathering of materials, etc. will be done outside of class time.

individuals needing accommodations

Any student needing special accommodations due to a disability must inform the instructor at the start of the semester and mutually develop an accessibility plan.

academic honesty

Academic misconduct is destructive to the central purpose of the University; is demeaning to the community of scholars in the School of Architecture; is unprofessional behavior, and inconsistent with an architect’s code of ethics; and is universally disdained. Academic misconduct is defined in the Code of Student Conduct (rev. March 1990) and each student must read and understand what constitutes academic misconduct, and the policies and procedures that govern the Code’s enforcement. Any student found guilty of committing an act of academic dishonesty will receive appropriate disciplinary action.

resources

Access to CADGIS Services: Art and Design Students can use services at the CADGIS Lab on the second floor in conjunction with their work in the Art and Design Studio. CADGIS services include large format printing, oversize scanning, equipment check out, file storage and an array of design and presentation software. For more information visit their website: http://www.cadgis.lsu.edu/

computer program requirements

This course will be using both computer drafting and graphics for representation. Students must own legal student licenses for software. Special price packages (and some free software) have been acquired for LSU students and are available via Tigerware on your PAWS account (computing services > software downloads).