



**Texas A&M University**  
College of Architecture

**ARCH 431 – Spring 2010**

**Architectural Structures II – Integrated Structures**

**Instructor:** Shelley Holliday  
**Office:** Williams Building 008 E  
**Office Hours:** Tuesday-Thursday 2-3:00 pm  
Monday – Wednesday 2:00-3:00 pm  
Open Door Policy, also by Appointment  
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**Course Description**

Selection and economics of structural systems in the context of integrating structural systems into a building through good design; analysis and design of wood, steel, concrete, and composite systems and members in relation to building design.

**Course Prerequisite**

In order to receive a final grade in ARCH 431, one must have successfully passed (no F's or I's) the prerequisite, COSC 321 or ENDS 231 (ARCH 331).

**Course Goal**

This class is designed to provide students with an understanding of how to integrate structural systems into a building through good design. Students who satisfactorily complete this class will be expected to know how to integrate structural systems into their architecture projects. Therefore, it will be taught at the appropriate level to accomplish this task.

**Learning Objectives**

- \* To be aware of appropriate structural elements and their relation to architectural form.
- \* To develop an understanding of fundamental structural theory and behavior of typical structural elements.
- \* Analysis and design of structural members in wood, steel, and concrete and their relation to good building design.

**References**

**Required Note set** at the WERC Building copy center (Wisnaker – 2<sup>nd</sup> Floor)  
ACI 318-02 Code and Commentary  
AISC 3<sup>rd</sup> ed. Load and Resistance Factor Design  
AISC 9<sup>th</sup> ed. Allowable Stress Design  
National Design Specifications for Wood

**Grading**

Throughout this course you will be required to solve problems and answer questions that are based on the material presented in the lectures and text or notes in order to achieve our goal of being able to integrate structural systems into a building through good design. Specifically, your letter grade for the course will be determined based on homework assignments, exams, special project(s), attendance and participation.

|  |               |
|--|---------------|
| Exams A, B & C   | 45% (3 @ 15%) |
| Homework   | 25%           |
| Final Exam   | 20%           |
| Special Projects   | 5%            |
| Attendance, Participation (must be in attendance to participate) | 5%            |

**Grades:**

$A \geq 90\%$   
 $90\% > B \geq 80\%$   
 $80\% > C \geq 70\%$   
 $70\% > D \geq 60\%$   
 $F < 60\%$

**Benchmark Assignment Policy**

Homework constitutes 25% of the final grade. In computing the final homework grade, the lowest (one) homework grade will be dropped from the average. It is recommended that you keep this “free ride” in your back pocket until the time when you really need it. You will still be responsible for the material of the dropped homework assignment. All homework is due on the date assigned, **at the beginning of class**, unless otherwise stated.

To receive a grade for a given assignment, you will be required to submit a formal solution report (see Reports below) completed on engineering paper on or before the stipulated deadline. Subject to Texas A&M University regulations, early submissions will not be especially rewarded, and **late submissions will not be accepted without a documented university excused absence.**

For each homework assignment, one or two problems may be collected at random for grading. Some homework assignments will be collected in their entirety. Therefore, it is recommended that each problem be solved in its entirety on a separate sheet(s) of **engineering** paper. Show all work including numbers in equations for proper credit.

**Reports**

This requirement applies only to benchmark assignments. Prepare formal solution reports on 8-1/2” x 11” paper. Preferably on engineers pad paper which is available in the bookstore. Work submitted on paper torn out of a spiral notebook will not be accepted. All work should be presented on one side of the paper only. Your name, course, section number, assignment number and due date must appear at the top of each page. The current page number as well as the total number of pages in the assignment must appear in the upper right corner of each page. The body of the report for each problem will consist of six sections.

- Problem: Give a problem statement in complete sentences.
- Given: State all that is known about the problem.
- Required: State what you have been asked to determine.
- Figures: Draw figures using a straight edge, show appropriate units, number each figure, and refer subsequently to a figure by its number.
- Solution: Present your solution in a logical and methodical manner.
- Summary: Provide an organized summary of the problem by listing each item from the required statement followed by its corresponding result from the solution section

**Tentative Schedule**

| <b><u>WEEK</u></b> | <b><u>DATE</u></b> | <b><u>TOPIC</u></b>                           |
|--------------------|--------------------|---|
| 1                  | 18 January         | Introduction and Load Tracing                 |
| 2                  | 25 January         | Design Loads, Material and Section Properties |
| 3                  | 1 February         | Beams   |
| 4                  | 8 February         | Beams   |
| 5                  | 15 February        | Beams   |
| 6                  | 22 February        | Beams/Columns                                 |
| 7                  | 1 March            | Columns                                       |
| 8                  | 8 March            | Columns                                       |
| 9                  | 15 March           | Spring Break                                  |
| 10                 | 22 March           | Columns                                       |
| 11                 | 29 March           | Foundations and Footings                      |
| 12                 | 5 April            | Connections /Concrete Details                 |
| 13                 | 12 April           | Timber Design                                 |
| 14                 | 19 April           | Timber Design                                 |

|    |          |                           |
|----|----------|---------------------------|
| 15 | 26 April | Course Summary and Review |
|----|----------|---------------------------|

\*\*This schedule is subject to change at anytime throughout the semester.

### Tentative Exam Schedule

| <u>Exam</u>                         | <u>Date</u>  | <u>Time</u>  |
|-------------------------------------|--|--|
| <b>A</b>                            | <b>9 February</b>  | <b>Class Time</b>  |
| <b>B</b>                            | <b>9 March</b>   | <b>Class Time</b>  |
| <b>C</b>                            | <b>6 April</b>   | <b>Class Time</b>  |
| <b>Final</b><br>Exam<br>Section 502 | 7 May, Friday<br>Check University<br>Final<br>Examination Schedule | 3:00-5:00 p.m.<br>Check University Final<br>Examination Schedule |

\*\*This schedule is subject to change at anytime throughout the semester.

**ALL EXAM WILL BE TAKEN WITH A NON-PROGRAMMABLE CALCULATOR**

| <b>Homework</b> | <b>Worth 25%</b> |
|-----------------|------------------|
| #1              |                  |
| #2              |                  |
| #3              |                  |
| #4              |                  |
| #5              |                  |
| #6              |                  |
| #7              |                  |
| #8              |                  |
| #9              |                  |
| #10             |                  |
| #11             |                  |
| <b>Total</b>    |                  |
| <b>Average</b>  |                  |

| <b>Exams</b> | <b>Worth</b> |  |  |
|--------------|--------------|--|--|
| <b>A</b>     | 15%          |  |  |
| <b>B</b>     | 15%          |  |  |
| <b>C</b>     | 15%          |  |  |
| <b>Final</b> | 20%          |  |  |

**Special Project(s)            5%**  
**Attendance, Participation   5%**

### **Academic Dishonesty**

Academic Integrity will follow the Aggie Honor Code.

**"An Aggie does not lie, cheat or steal, or tolerate those who do."**

Refer to the Honor Council Rules and Procedures

<http://www.tamu.edu/aggiehonor>

Each student will be asked to sign this statement for exams in this course:

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

It is the mission of the Aggie Honor System Office to serve as a centralized system established to respond fairly to academic violation of the honor code at Texas A&M University.

The Texas A&M University Student Rules provide the official definition of scholastic dishonesty and acts that are characterized as scholastically dishonest at:

<http://student-rules.tamu.edu/rule20.htm>.

### **Attendance:**

It is expected that the student will attend all classes. Attendance will be taken periodically. No **phantom** assignments will be accepted from those not in attendance. Excessive absence will result in a lowering of the final grade. See University Rules and Regulations.

The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will be given and assignments will be due. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Students are advised to consult the University regulations for a list of authorized absences.

### **Special Considerations:**

The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Student with Disabilities (SSD) in Room B118 in Cain Hall or call 845-1637. <http://studentlife.tamu.edu/ssd/>

### ***A Teacher's Creed***

*"In the classroom on the first day of a new school year, I am eager to meet my students. I have rehearsed my greeting and first day's remarks, but no matter how many years I've prepared for this procedure, it's always new. My heart pumps a bit harder, faster; I feel adrenaline like an athlete, or like an actor, or maybe like a novice public speaker. It's a marvelous feeling, this first day, because I know that something special is going to happen, and I know it because I've experienced it before and I know that I will experience it every time I meet a new class throughout my venerable career. And then they're seated before me and I smile at this special feeling. This is an assembly of students, yes. But there's so much more, because each of these young persons is more than just a student entrusted to me. Each of these students has a story to tell, a lifetime; however brief, of experiences, a history of in volumes whose richness and depth I can barely begin to fathom. And so as I absorb the first glimpse of these young charges, I must appreciate the extent of my responsibility, of the privilege I've accepted in presenting these young souls my special knowledge. In offering them my talent and passion, I am adding an enormous array of new bright stars to the vast firmament of their minds, stars that will never have time to fade in their lifetimes. I will be part of their story. And I know that each of them will always be part of mine. And that's a good feeling, a feeling that is perpetually renewed, revisited, and rewritten in A Teacher's Creed."*