



Course title and number      ARCH 331 – Architectural Structures (section 100)  
Term                                Summer 2014  
Meeting times and location    Lecture/Lab: 2 - 4 pm M,T,W,R, F in 111 Langford C

### Course Description and Prerequisites

Architectural Structures. (2-2). Credit 3. Physical principles that govern statics and strength of materials through the design of architectural structures from a holistic view, in the context of architectural ideas and examples; introduction to construction, behavior of materials, and design considerations for simple and complex structural assemblies; computer applications. Prerequisites: Junior or senior classification in environmental design; MATH 142 or equivalent; PHYS 201.

### Learning Outcomes or Course Objectives

- The student will be able to read a text or article about structural technology, identify the key concepts and related equations, and properly apply the concepts and equations to appropriate structural problems (**relevance**). The student will also be able to define the answers to key questions in the reading material. The student will be able to evaluate their own skills, or lack thereof, with respect to reading and comprehension of structural concepts, **clarity** of written communication, reasonable determination of **precision** in numerical data, and **accuracy** of computations.
- The student will be able to read a problem statement, interpret the structural wording in order to identify the concepts and select equations necessary to solve the problem presented (**significance**). The student will be able to identify common steps in solving structural problems regardless of the differences in the structural configuration and loads, and apply these steps in a clear and structured fashion (**logic**). The student will draw upon existing mathematical and geometrical knowledge to gather information, typically related to locations and dimensions, provided by representational drawings or models of structural configurations, and to present information, typically in the form of plots that graph variable values. The student will be able to draw representational structural models and diagrams, and express information provided by the figures in equation form. The student will compare the computational results in a design problem to the requirements and properly decide if the requirements have been met. The student will take the corrective action to meet the requirements.
- The student will create a structural model with a computer application based on the concepts of the behavior and loading of the structural member or assemblage. The student will be able to interpret the modeling results and relate the results to the solution obtained by manual calculations.
- The student will be able to articulate the physical phenomena, behavior and design criteria which influence structural space and form. (**depth**) The student will be able to identify the structural purpose, label, behavior, advantages and disadvantages, and interaction of various types of structural members and assemblies. (**breadth**) The student will create a physical structure or structures using non-traditional building materials, considering material and structural behavior, in order to demonstrate the behavior and limitations of a variety of structural arrangements. The student will produce proper documentation and drawings of the size, spacing, location and connection of parts for the construction of the structure.
- The student will interact and participate in group settings to facilitate peer-learning and teaching. In addition, the student will be able to evaluate the comprehension of concepts, clarity of communication of these concepts or calculations, and the precision and accuracy of the data used in the computations in the work of their peers.

### Instructor Information

Name Dr. Anne Nichols, Associate Professor of the Practice  
Telephone number (979) 845-6540  
Email address anichols@tamu.edu  
Office hours 11 am-12 pm MWF, 12-1:30 pm TR (*and by appointment*)  
Office location A413 Langford

### Textbook and/or Resource Material

#### Required Text:

- Statics and Strength of Materials –Foundations for Structural Design, Onouye, (2005) Pearson - Prentice Hall, ISBN 0-13-111837-4

#### Recommended Texts:

- A Structures Primer, Kaufman, (2010) Prentice Hall, ISBN 978-0-13-230256-3
- Understanding Structures, Moore, (1999) McGraw-Hill, ISBN 9780070432536

#### References:

- ACI 318-11 Code and Commentary
- AISC 14<sup>th</sup> ed. Steel Construction Manual
- Masonry Joint Structural Code
- National Design Specifications for Wood

### Grading Policies

Students should refer to the Academic section in Student Rules and Regulations  
<http://student-rules.tamu.edu>.

#### Assignments:

- Due as stated on the assignment statements.
- Only one assignment without University excuse may be turned in for credit no later than **two lectures** after the due date **and** before final exams begin. All other assignments will receive no credit if late without a recognized excuse or after final exams have begun.
- Assignments with incorrect formatting will be penalized.

#### Format:

Date	Name	Course
Given:		
Find:		
Solution:		
:		

#### Quizzes:

- Quizzes will be given at any time during the class period. Make-up quizzes without an excuse will not be given.
- Practice quizzes will be posted electronically.
- No quiz scores will be “dropped”.
- *Use of cell phones with a calculator application during quizzes and exams is prohibited.*

#### Final Exam:

- The final exam will be comprehensive and is officially scheduled for **3:30-5:30 PM Monday, July 7.**

#### Teaching Assistant:

- n/a ()

#### Structures Help Desk:

- n/a ()
- ARCA129 845-6580 [Posted Hours](#) (link)

#### Other Resources:

- The Student Learning Center provides tutoring in math and physics. (<http://slc.tamu.edu/tutoring.shtml>) Other tutoring services are listed at <http://scs.tamu.edu/sites/default/files/tutoring.pdf>. The Academic Success Center offers workshops at <http://us.tamu.edu/Undergraduate-Studies/Academic-Success-Center>

#### Grievances:

- For grievances other than those listed in Part III in Texas A&M University Student Rules: <http://student-rules.tamu.edu/> the *instructor* must be the first point of contact.

### Other Pertinent Grading Information (Rubric Included)

The levels listed for graded work (projects, quizzes, exams) and pass-fail work (assignments) **must both be met** to earn the course letter grade:

Letter Grade	Graded work	Pass-Fail work
A	A average (90-100%)	Pass for 90 to 100%of assignments
B	B average (80-89%)	Pass for 80 to 100% of assignments
C	C average (70-79%)	Pass for 72 to 100% of assignments
D	D average (60-69%)	Pass for 62 to 100% of assignments
F	F average (<59%)	Pass for 0% to 100% of assignments

**Graded work:** This typically constitutes 6 quizzes, a learning portfolio (worth 1.5 quizzes) and a final exam (worth 3 quizzes). This equates to proportions of approximately 57% to quizzes, 14% to the learning portfolio, and 29% to the final exam.

**Pass/fail work:** This constitutes all practice assignments and projects, each with a value of 1 unit. Criteria for passing is *at least* 75% completeness and correctness along with every problem attempted. Percent effort expected for a problem in a practice assignment is provided on the assignment statement. This is considered a lab course and the assignments **are required work** with credit given for competency. The work is necessary to apply the material and prepare for the quizzes and exam. It is expected that this work will be completed with assistance or group participation, but all *graded* work is only by the individual.

### Attendance Policies

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at <http://student-rules.tamu.edu/rule07>

Project due dates will be provided in the project statements. Students should contact the instructor if work is turned in late due to an absence that is excused under the University's attendance policy. In such cases the instructor will either provide the student an opportunity to make up any quiz, exam or other graded activities or provide a satisfactory alternative to be completed within 30 calendar days from the last day of the absence. There will be no opportunity for students to make up work missed because of an unexcused absence.

### Other Pertinent Attendance Information

Absences related to illness or injury must be documented according to <http://shs.tamu.edu/attendance.htm> including the Explanatory Statement for Absence from class for 3 days or less. Doctor visits not related to immediate illness or injury are not excused absences.

Lecture, Lab, and Textbook:

- The lecture slides should be viewed prior to class. Class will be reserved for review of the lectures. Lab will consist of problem solving requiring the textbook. The lecture slide handouts are available on the class web page and eCampus.
- Attendance is required for both lecture and lab.
- *Use of electronic devices during lecture and lab is prohibited.*

Notes:

- The notes and related handouts are available on the class web page at <http://faculty.arch.tamu.edu/anichols/331frame.html>, or on eCampus. A bound set can be purchased from the Notes-n-Quotes at 701 W. University, directly across from the Mitchell Physics Building in the Northgate Neighborhood.

eCampus:

- eCampus is the on-line course system useful for downloading files, uploading assignments, reading messages and replying, as well as posting scores; and is accessed with your neo account. This will be used to post class materials, questions and responses by class members and the instructor, and scores. It can be accessed at <http://ecampus.tamu.edu/>

## Course Topics, Calendar of Activities, Major Assignment Dates

### Tentative Schedule *(subject to change at any time throughout the semester)*

Note: Materials in the Class Note Set not specifically mentioned above are provided as references or aids.

Week	Topic	Required Reading/Problems
1	1. Design Loads and Structural Performance Requirements + Structural Systems, Planning and Design	<b>Read*:</b> Ch. 1, § 5.1, Appendix B; note sets 2.1, 2.2, 2.3 & 2.4 <b>Reference:</b> <i>note set 2.5</i> <b>Solve:</b> Assignment 1 ( <i>start</i> )
	2. Forces and Moments	<b>Read:</b> Ch. 2; note sets 3.1 & 3.2 <b>Due:</b> Assignment 1 over material from lectures 1
	3. Equilibrium of a Point & Analysis of Planar Trusses	<b>Read:</b> § 3.1, pg. 89-95; note set 4.1 <b>Reference:</b> <i>note set 4.2</i>
	4. Rigid Body Equilibrium & Analysis of Planar Trusses	<b>Read:</b> § 3.2, 3.3, pg. 98-110; note sets 5.1 & 5.2 <b>Due:</b> Assignment 2 over material from lectures 2 & 3
	5. Mechanics of Materials	<b>Read:</b> Ch. 6; note sets 6.1, 6.2 & 6.3 <b>Reference:</b> <i>note set 6.4</i> <b>Due:</b> (Cardboard Couch Swing Design) Project
2	6. Beam Shear and Bending & Diagrams	<b>Read:</b> § 8.1-8.4, note set 7 <b>Reference:</b> <i>note sets 8.1 &amp; 8.2</i> <b>Quiz 1</b> over material from lectures 1-3
	7. Beam Section Properties	<b>Read:</b> § 7.1-7.4; note sets 9.1 & 9.2 <b>Due:</b> Assignment 3 over material from lectures 4 & 5
	8. Beam Stresses	<b>Read:</b> § 9.1-9.4; note set 10.1 <b>Reference:</b> <i>note set 10.2</i>
	9. Other Beams and Pinned Frames	<b>Read:</b> § 4.2, pg. 73; note set 11 <b>Quiz 2</b> over material from lectures 4-6
	10. Rigid Frames - Compression & Buckling	<b>Read:</b> § 10.1, 10.2 & 10.5; note sets 12.1 & 12.2 <b>Reference:</b> <i>note set 12.3</i> <b>Due:</b> Assignment 4 over material from lectures 6-8
3	11. Design Loads, Codes and Methodology, System Assemblies and Load Tracing	<b>Read:</b> § 5.1, 5.2, 5.3, 4.4; note set 13.1 & 14 <b>Reference:</b> <i>note sets 13.2, 13.3, 13.4, 13.5</i>
	12. Wood Construction Materials & Beam Design	<b>Read:</b> § 9.5-9.6; note sets 15.1 & 15.2 <b>Due:</b> Assignment 5 over material from lectures 9 & 10
	13. Column Design	<b>Read:</b> § 10.4; note set 15.1 <b>Quiz 3</b> over material from lectures 7-10
	14. Joints and Connection Stresses	<b>Read:</b> note set 15.1
	15. Steel Construction Materials & Beam Design	<b>Read:</b> note set 18 <b>Due:</b> Assignment 6 over material from lectures 11-13
4	16. Trusses, Decks & Plate Girders	<b>Read:</b> pg. 98-110; note set 18 <b>Reference:</b> <i>note set 5.2</i>
	17. Column Design & Tension Members	<b>Read:</b> § 10.3; note set 18 <b>Quiz 4</b> over material from lecture 11-14
	18. Bolted Connections & Welds	<b>Read:</b> note set 18 <b>Due:</b> Assignment 7 over material from lectures 14-16
	19. Concrete Construction Materials & Beam Design	<b>Read:</b> note set 22.1 <b>Reference:</b> <i>note set 22.2</i>
	20. T-beams & Slabs	<b>Read:</b> note set 22.1 <b>Due:</b> Assignment 8 over material from lectures 17-18
5	21. Shear, Torsion, Reinforcement & Deflection	<b>Read:</b> note sets 22.1 & 24 <b>Quiz 5</b> over material from lectures 15-18
	22. Floor Systems & Continuous Beams Columns & Frames	<b>Read:</b> note sets 22.1, 25.1 & 25.3 <b>Reference:</b> <i>note set 25.2</i> <b>Due:</b> Assignment 9 over material from lectures 19 & 20
	23. Foundation Design & Footings	<b>Read:</b> note sets 27.1 & 27.2
	24. Masonry Construction Beams & Columns	<b>Read:</b> note set 28.1 <b>Reference:</b> <i>note sets 28.2 &amp; 28.3</i> <b>Due:</b> Assignment 10 over material from lectures 21-23 and Learning Portfolio
FINAL: 3:30-5:30 PM Monday, July 7 (comprehensive)		<b>Quiz 6</b> over material from lectures 19-22

## **Americans with Disabilities Act (ADA)**

The Americans 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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>

## **Academic Integrity**

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

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. *For additional information please visit:*

<http://aggiehonor.tamu.edu>

## **Care of Facilities**

The use of spray paint or other surface-altering materials is not permitted in the Langford Complex, except in designated zones. Students who violate this rule will be liable for the expenses associated with repairing damaged building finishes and surfaces. At the end of the semester, your area must be clean of all trash.

## **Studio Policy (required of all studios)**

All students, faculty, administration and staff of the Department of Architecture at Texas A&M University are dedicated to the principle that the Design Studio is the central component of an effective education in architecture. They are equally dedicated to the belief that students and faculty must lead balanced lives and use time wisely, including time outside the design studio, to gain from all aspects of a university education and world experiences. They also believe that design is the integration of many parts, that process is as important as product, and that the act of design and of professional practice is inherently interdisciplinary, requiring active and respectful collaboration with others.

Students and faculty in every design studio will embody the fundamental values of optimism, respect, sharing, engagement, and innovation. Every design studio will therefore encourage the rigorous exploration of ideas, diverse viewpoints, and the integration of all aspects of architecture (practical, theoretical, scientific, spiritual, and artistic), by providing a safe and supportive environment for thoughtful innovation. Every design studio will increase skills in professional communication, through drawing, modeling, writing and speaking.

Every design studio will, as part of the syllabus introduced at the start of each class, include a clear statement on time management, and recognition of the critical importance of academic and personal growth, inside and outside the studio environment. As such it will be expected that faculty members and students devote quality time to studio activities, while respecting the need to attend to the broad spectrum of the academic life. Every design studio will establish opportunities for timely and effective review of both process and products. Studio reviews will include student and faculty peer review. Where external reviewers are introduced, the design studio instructor will ensure that the visitors are aware of the Studio Culture Statement and recognize that the design critique is an integral part of the learning experience. The design studio will be recognized as place for open communication and movement, while respecting the needs of others, and of the facilities.

## **Important Links Below**

Department of Architecture Website	<a href="http://dept.arch.tamu.edu/">http://dept.arch.tamu.edu/</a>
Department Financial Assistance	<a href="http://dept.arch.tamu.edu/financial-assistance/">http://dept.arch.tamu.edu/financial-assistance/</a>
Academic Calendar	<a href="http://admissions.tamu.edu/registrar/general/calendar.aspx">http://admissions.tamu.edu/registrar/general/calendar.aspx</a>
Final Exam Schedule Online	<a href="http://admissions.tamu.edu/registrar/general/finalschedule.aspx">http://admissions.tamu.edu/registrar/general/finalschedule.aspx</a>
On-Line Catalog	<a href="http://catalog.tamu.edu">http://catalog.tamu.edu</a>
Student Rules	<a href="http://student-rules.tamu.edu/">http://student-rules.tamu.edu/</a>
Aggie Honor System Office	<a href="http://aggiehonor.tamu.edu/">http://aggiehonor.tamu.edu/</a>
American Institute of Architecture website	<a href="http://www.aia.org/index.htm">http://www.aia.org/index.htm</a>

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
MAY	18	19	20	21	22	23	24
	25	26 Memorial Day	27	28	29	30 last day to register	31
JUNE	1	2 <b>Lect 1</b> session I classes begin	3 <b>Lect 2</b> #1 due	4 <b>Lect 3</b>	5 <b>Lect 4</b> #2 due last day to add	6 <b>Lect 5</b> project due	7
	8	9 <b>Lect 6</b> Quiz 1	10 <b>Lect 7</b> #3 due	11 <b>Lect 8</b>	12 <b>Lect 9</b> Quiz 2	13 <b>Lect 10</b> #4 due	14
	15	16 <b>Lect 11</b>	17 <b>Lect 12</b> #5 due	18 <b>Lect 13</b> Quiz 3	19 <b>Lect 14</b>	20 <b>Lect 15</b> last day to Q-drop #6 due	21
	22	23 <b>Lect 16</b>	24 <b>Lect 17</b> Quiz 4	25 <b>Lect 18</b> #7 due	26 <b>Lect 19</b>	27 <b>Lect 20</b> #8 due	28
	29	30 <b>Lect 21</b> Quiz 5	1 <b>Lect 22</b> #9 due	2 <b>Lect 23</b>	3 <b>Lect 24</b> #10 and portfolio due Quiz 6	4 Independence Day	5
	6	7 Final Exams 3:30 - 5:30pm 331 FINAL	8 session II classes begin	9	10 grades due	11	12
JULY	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	1	2
	3	4	5	6	7	8	9
AUGUST	10	11	12 Final Exams	13 end of summer II term	14	15 Commencement	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29 last day to register	30
	31	1 classes begin	2	3	4	5 last day to add	6