



Course title and number ARCH 631 – Applied Architectural Structures (section 600)  
Term Spring 2018  
Meeting times and location 2:20-3:35 pm T,R in 402 Langford A

### Course Description and Prerequisites

Applied Architectural Structures. (3-0). Credit 3. Structural analysis of building structural systems: components, frames, shapes; selection and economics of structural systems; survey of current structural design codes; supervision practices in structural construction. Prerequisite: Graduate classification or approval of instructor.

### Learning Outcomes

Every student will have the opportunity to develop an understanding of architectural structures and appropriate application through analysis of form, function, and design processes. By exploring the behavior of structural assemblies and components, and design calculations, students will develop an understanding of the structural design process and what affects the design decisions. Students who successfully complete this course will be able to:

- Recognize and identify structural assemblies, components, connections, and framing plans [Knowledge].
- Understand, characterize, and quantify environmental loads for structural modeling [Knowledge, Comprehension & Application].
- Understand basic structural phenomena for assemblies, components, and connections under environmental loads and the relationship to structural performance requirements [Comprehension & Analysis].
- Identify the relationship and importance of material characteristics to the structural design process in the context of design codes [Knowledge & Comprehension].
- Interpret and solve structural analysis and design problems [Knowledge, Application, Analysis, & Evaluation].
- Understand planning strategies for contemporary structural systems, and variables affecting design for efficient, optimized, and economical structural systems or components [Comprehension, Application & Analysis].
- Synthesize knowledge of components, systems and framing with environmental loads and design codes and standards [Evaluation & Synthesis].
- Demonstrate preparation in the structural systems topics of the professional architectural registration exam [Application].

### Instructor Information

Name Dr. Anne Nichols, Associate Professor of the Practice  
Telephone number (979) 845-6540  
Email address anichols@tamu.edu  
Office hours 12:30-2 pm MW, 1-2 pm TR (*and by appointment*)  
Office location A435 Langford

### Textbook and Resource Material

Required Text:

- Structures, 7<sup>th</sup> ed., Daniel L. Schodek and Martin Bechthold, (2014) Pearson – Prentice Hall, ISBN 978-0-13-255913-3

Recommended Texts:

- A Structures Primer, Kaufman, (2010) Prentice Hall, ISBN 978-0-13-230256-3
- Understanding Structures, Moore, (1999) McGraw-Hill, ISBN 9780070432536
- The Structural Basis of Architecture, Sandaker, et.al, (2011) Routledge, ISBN 978-0415415477

References:

- AIA Publications
- Adoptable codes (ICBO, SBCCI, BOCA, CABO)
- International Building Code, International Residential Code
- Structural Design Codes (ACI, PCI, AISC, MSJC, etc.)
- Material and Professional Standard Documents (ANSI, ASCE, ASTM, ASHRAE)

**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 one week 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.
- Peer review assignments and term projects **cannot** be submitted late.

Team Project:

- A term project to be completed in teams is due the last week of class. Presentations of the projects will be made during class periods.

Mid-term Exams:

- Mid-term exams will be given in lecture at any time during the period. Make-up exams without an excuse will not be given.
- *Use of cell phones with a calculator application during exams is prohibited.*

Final Exam:

- The final exam will be comprehensive and is officially scheduled for **1-3 PM Tuesday, May 8**

Teaching Assistant:

- Allison McGehee (am260344@tamu.edu)

Structures Help Desk:

- Hardik Jariwala (hardikjariwala21@email.tamu.edu)
- ARCA 400B 845-6580 Posted Hours: <http://faculty.arch.tamu.edu/anichols/schedule/>

Other Resources:

- The Academic Success Center offers workshops and provides tutoring in math and physics at Tutor Zones across campus <http://successcenter.tamu.edu/> Other tutoring services are listed at <http://disability.tamu.edu/resources/tutoring>

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.

**Grading Information and Rubric**

		<i>Letter Grades (Approximate):</i>	90-100..... A
Assignments .....	20%		80-89..... B
Mid-term Exams .....	40%		70-79..... C
Team Project .....	20%		60-69..... D
Final Exam.....	20%		0-59..... F

**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> 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:

- The lecture slides should be viewed prior to class. Class will be reserved for review of the lectures and require problem solving with the lecture examples, assignments, and case studies. The lecture slide handouts are available on the class web page and eCampus.
- *Use of electronic devices during lecture is prohibited.*

Notes:

- The notes and related handouts are available on the class web page at <http://faculty.arch.tamu.edu/anichols/courses/applied-architectural-structures/>, or on eCampus. A bound set can be purchased online from Notes-n-Quotes at <https://squareup.com/store/notes-n-quotes>

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 NetID. 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. Structures: An Overview; Introduction to Structural Analysis and Design	<b>Read*:</b> Ch. 1 <b>Solve:</b> Assignment 1 ( <i>start</i> )
	2. Review of Statics and Mechanics	<b>Read:</b> Ch. 2; note sets 2.1 & 2.2 <b>Reference:</b> <i>Appendices 1-5</i>
2	3. Overview of Building Codes	<b>Read:</b> Ch. 3; note sets 3.1 & 3.2 <b>Reference:</b> <i>note sets 3.3, 3.4 &amp; 3.5</i>
	4. Overview of Design Philosophies and Beams	<b>Read:</b> § 6.1-6.4.1, § 8.1-8.3, & Appendices 3-11 <b>Reference:</b> <i>note set 4.1 &amp; 4.2</i> <b>Due:</b> Assignment 1 over material from lectures 1-2
3	5. Trusses & Columns	<b>Read:</b> Ch. 4, § 7.1-7.4.2, & Appendix 13 <b>Reference:</b> <i>note set 5.1</i>
	6. Funicular Structures: Cables & Arches	<b>Read:</b> Ch. 5 <b>Due:</b> Assignment 2 over material from lectures 3-4
4	7. Rigid Frames: Analysis & Design	<b>Read:</b> Ch. 9; note set 7.1 <b>Reference:</b> <i>note set 7.2</i> <b>Due:</b> PR 1 Text over material from lecture 4
	8. Plates and Grids	<b>Read:</b> Ch. 10 & § 8.4; note set 8.1 <b>Due:</b> Assignment 3 over material from lectures 5-6 & PR 1 Reviews
5	9.	<b>Mid-term Exam</b> over material from lectures 1-6
	10. Reinforced Concrete Construction	<b>Read:</b> § 15.3, 6.4.4-6.4.7, 7.4.5 & 8.4.6, Appendix 12; note set 10.1
6	11. CASE STUDY – Reinforced Concrete	<b>Read:</b> note set 11
	12. CASE STUDY – Reinforced Concrete	<b>Read:</b> note set 11 <b>Due:</b> Assignment 4 over material from lecture 7

<b>Week</b>	<b>Topic</b>	<b>Required Reading/Problems</b>
7	13. Membrane, Net, and Shell Structures	<b>Read:</b> Ch. 11 & 12; note set 13.1
	14. Structural Planning & Design Issues	<b>Read:</b> Ch. 13, § 15.5 & 15.6; note set 14 <b>Due:</b> Assignment 5 over material from lectures 7-8
8	15. Design for Lateral Loads Wind and Flood	<b>Read:</b> § 14.1; note sets 15.1 & 15.4 <b>Re-read:</b> § 1.3.1, 1.3.2, 3.3.3 <b>Due:</b> PR 2 Text over material from lecture 10
	16. Design for Lateral Loads Seismic	<b>Read:</b> § 14.2; note sets 16.1, 16.2 & 16.3 <b>Re-read:</b> § 3.3.4 <b>Due:</b> Assignment 6 over material from lectures 10-12 & PR 2 Reviews
9	17. Structural Connections: Wood and Steel	<b>Read:</b> Ch. 16; note set 17.1
	18.	<b>Mid-term Exam</b> over material from lectures 7,8, and 10-14
10	19. Wood Construction	<b>Read:</b> § 15.2, 6.4.2, & 7.4.3, Appendix 14; note set 19.1
	20. CASE STUDY – Wood	<b>Read:</b> note set 20 <b>Due:</b> Assignment 7 over material from lectures 13-15
11	21. Steel Construction	<b>Read:</b> § 15.4, 6.4.3 & 7.4.4; note set 21.1 <b>Due:</b> PR 3 Text over material from lectures 15 & 17
	22. CASE STUDY – Steel	<b>Read:</b> note set 22 <b>Due:</b> Assignment 8 over material from lectures 15-17 & PR 3 reviews
12	23. Masonry Construction	<b>Read:</b> note set 23.1
	24. Foundations and Retaining Walls	<b>Read:</b> §15.7; note sets 24.1 & 24.2 <b>Due:</b> Assignment 9 over material from lectures 19-22
13	25.	<b>Mid-term Exam</b> over material from lectures 15-17, 19, and 20
	26. Project Presentations	
14	27. Project Presentations	
	28. Construction & Inspection; Review	<b>Reference:</b> <i>note set 28.1</i> <b>Due:</b> Assignment 10 over material from lectures 23-24, Learning Evaluation & Project Report
<b>FINAL:</b>	<b>1-3 PM Tuesday, May 8</b>	(comprehensive)

### **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

Please respect your facilities in the College of Architecture (studio space, photo lab, shop, labs,...)

The use of spray paint, spray adhesive or other surface-altering materials is not permitted in the Langford Complex, except in designated zones. (We do have a spray booth facilities located on our complex.) Students who violate this rule will be liable for the expenses associated with repairing damaged building finishes and surfaces. \

Throughout the semester and at the end of the semester, your area must be clean of all trash.

No power tools may be used in the design studio. No dust or odor producing processes may be conducted in the studio. No wet casting processes may be conducted in the studio. The college shop and spray booth facilities must be used for the above mentioned processes.

Professional behavior and conduct is expected of each student.

**All studio desks must be covered. In addition students must have at minimum an 18" x 24" cutting mat at their desk.**

### 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://registrar.tamu.edu/general/calendar.aspx">http://registrar.tamu.edu/general/calendar.aspx</a>
Final Exam Schedule Online	<a href="http://registrar.tamu.edu/Courses,-Registration,-Scheduling/Final-Exam-Schedule">http://registrar.tamu.edu/Courses,-Registration,-Scheduling/Final-Exam-Schedule</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>
Texas Society of Architects	<a href="https://texasarchitects.org/">https://texasarchitects.org/</a>
American Institute of Architecture website	<a href="http://www.aia.org/index.htm">http://www.aia.org/index.htm</a>
AIA Brazos (local chapter)	<a href="http://www.aiabrazos.org/">http://www.aiabrazos.org/</a>

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
7 JANUARY	7	8	9	10	11	12 last day to register	13
	14	15 King Holiday	16 Lect 1 classes begin	17	18 Lect 2	19	20
	21	22 last day to add	23 Lect 3	24	25 Lect 4 #1 due	26	27
	28	29	30 Lect 5	31	1 Lect 6 #2 due	2	3
FEBRUARY	4	5	6 Lect 7 PR 1 text due	7	8 Lect 8 #3 & PR 1 rev due	9	10
	11	12	13 Lect 9 Exam 1	14	15 Lect 10	16	17
	18	19	20 Lect 11	21	22 Lect 12 #4 due	23	24
	25	26	27 Lect 13	28	1 Lect 14 #5 due	2	3
MARCH	4	5 mid-term grades due	6 Lect 15 PR2 text due	7	8 Lect 16 #6 & PR2 text due	9	10
	11	12	13	14 Spring Break	15	16	17
	18	19	20 Lect 17	21	22 Lect 18 Exam 2	23	24
	25	26	27 Lect 19	28	29 Lect 20 #7 due	30 Reading Day	31
APRIL	1	2	3 Lect 21 PR 3 text due	4	5 Lect 22 #8 & PR 3 rev due pre-registration begins	6	7
	8	9	10 Lect 23	11	12 Lect 24 #9 due	13	14
	15	16	17 Lect 25 Exam 3 last day to Q-drop	18	19 Lect 26 presentations	20	21 Muster
	22	23	24 Lect 27 presentation	25	26 Lect 28 #10, project & evals due	27	28
	29	30 (dead day) Monday classes	1 (dead day) Friday classes	2 Reading Day	3 Final exams	4	5
MAY	6	7	8 1-3 pm 631 FINAL	9	10 Commencement (Fri. and Sat.)	11	12
	13	14 Grades due	15	16	17	18	19
	20	21	22	23	24	25	26