



Course title and number ARCH 614 – Elements of Architectural Structures (section 600)
Term Spring 2019
Meeting times and location 8-9:40 am T,R in 403 Langford A

Course Description and Prerequisites

Elements of Architectural Structures. (2-2). Credit 3. Investigation of the structural factors that influence the development of architectural space and form; introduction of the physical principles that govern statics and strength of materials through design of timber and steel components of architectural structures. Prerequisite: ARCH 612 or approval of instructor.

Learning Outcomes

Every student will have the opportunity to develop an understanding of architectural structures through analysis of form, function, and design processes. By exploring the physics, assemblies, structural 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 load representations for structural modeling [Knowledge, Comprehension & Application].
- Identify the relationship and importance of material characteristics to the structural design process [Knowledge & Comprehension].
- Interpret and solve structural analysis and design problems [Knowledge, Application, Analysis, & Evaluation].
- Understand how the structure and its design affects the general architectural design work [Comprehension].
- Develop a consciousness about the structural design work, what affects structural design decisions, and the effect of manipulation of design variables [Comprehension, Evaluation].

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, 10-11 am TR (*and by appointment*)
Office location A435 Langford

Textbook and Resource Material

Required Text:

- Simplified Engineering for Architects and Builders, 12th ed., Ambrose & Tripeny, (2011) Wiley, ISBN 978-1-118-97504-6 (hardcopy) or ISBN 978-1-118-97530-5 (epub)

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 318-14 Code and Commentary
- AISC 15th 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 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.
- Assignments with incorrect formatting will be penalized.
- All necessary work **must** be provided for credit.
- Learning evaluations **cannot** be submitted late without a recognized excuse.

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 **1-3 PM Friday, May 3**

Teaching Assistant:

- Mihika Patel (mihika@tamu.edu)

Structures Help Desk:

- Megan Dorsey (medorsey@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

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

<i>Letter Grade</i>	<i>Graded work</i>	<i>Pass-Fail work</i>
A	A average (90-100%)	Pass for 90 to 100%of assignments
B	B average (80-89%)	Pass for 83 to 100% of assignments
C	C average (70-79%)	Pass for 75 to 100% of assignments
D	D average (60-69%)	Pass for 65 to 100% of assignments
F	F average (<59%)	Pass for 0% to 100% of assignments

* the lowest row determines the letter grade

Graded work: This typically constitutes 7 quizzes, learning evaluations (worth 1.5 quizzes) and a final exam (worth 3 quizzes). This equates to proportions of approximately 61% to quizzes, 13% to the learning portfolio, and 26% 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. After the first assignment that does not receive a passing grade, each non-passing assignment corresponds to a letter grade reduction in the Pass-Fail criteria that is with all assignments.

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> Students who request an excused absence are required to uphold the Aggie Honor Code and Student Conduct Code (See [TAMU Student Rule 24](#))

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, 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.
- *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/courses/elements-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. Structural Performance Requirements, Systems, Math and Applied Physics	Read*: Text Introduction (pp. xvii-xxiii), 4.1 & 17.4; note sets 1.1, 1.2 & 1.3 Practice: <i>Math Worksheets</i> Solve: Assignment 1 (<i>start</i>)
	2. Forces	Read: Text 1.1-1.4; note set 2
2	3. Equilibrium, Free Body Diagrams & Analysis of Planar Trusses	Read: Text 2.6-2.7; note set 3.1 Reference: <i>note set 3.2</i> Due: Assignment 1 over material from lectures 1 & 2
	4. Response to Forces and Temperature	Read: Text 2.1, 2.2, 3.1; note set 4
3	5. Moments, Rotational Equilibrium, Beam Reactions & Analysis of Planar Trusses	Read: Text 1.5-1.7; note set 5.1 & 5.2 Due: Assignment 2 over material from lectures 2-3 & Project Part I (Cardboard Couch Swing Design)
	6. Beam Shear and Bending	Read: Text 3.2-3.5; note set 6.1 Reference: <i>note set 6.2</i> Quiz 1 over material from lectures 1-3

Week	Topic	Required Reading/Problems
4	7. Semi-graphical Method: Shear and Bending Moment Diagrams	Read: note set 6.1 Reference: <i>note set 6.3</i> Due: Assignment 3 over material from lectures 4 & 5
	8. Beam Section Properties	Read: Text Appendix A; note set 8
5	9. Beam Stresses	Read: Text 3.6-3.7; note set 9 Due: Assignment 4 over material from lectures 6 & 7
	10. Other Beams and Pinned Frames	Read: Text 3.8 & 2.4; note sets 10.1 & 10.2 Quiz 2 over material from lectures 4 & 5
6	11. Rigid Frames - Compression & Buckling	Read: Text 2.8, 3.9-3.13 (not footing pressure analysis in 3.9); note set 11.1 Reference: <i>note set 11.2</i> Due: Assignment 5 over material from lectures 8 & 9
	12. Design Loads and Methodology	Read: Text 1.8-1.11; note set 12.1 Reference: <i>note sets 12.2, 12.3, 12.4 & 12.5</i>
7	13. Wood Construction Materials & Beam Design	Read: Text 4.5 & 5 (all); note sets 13.1 & 13.2 Quiz 3 over material from lectures 6, 7 & 8 Due: Mid-term Learning Evaluation
	14. Column Design	Read: Text 6; note set 13.2 Due: Assignment 6 over material from lectures 10 & 11
8	15. Joints and Connection Stresses	Read: Text 7; note sets 13.2 & 15 Due: Assignment 7 over material from lectures 12 & 13
	16. Steel Construction Materials & Beam Design	Read: Text 4.6 & 8 (all); Text 9.1-9.8; note set 16 Quiz 4 over material from lectures 9-12
9	17. Trusses, Decks & Plate Girders	Read: Text 9.9-9.12; note sets 16 (review note set 5.2) Due: Assignment 8 over material from lectures 14-15
	18. Column Design	Read: Text 10; note set 16
10	19. Bolted Connections & Tension Members	Read: Text 11; note set 16 Due: Assignment 9 over material from lectures 16-17
	20. Welds and Light Gage Steel	Read: Text 12; note set 16 Quiz 5 over material from lectures 13, 14 & 15
11	21. Concrete Construction Materials & Beam Design	Read: Text 4.7, 13.1–13.3; note set 21.1 Reference: <i>note set 21.2</i> Due: Assignment 10 over material from lectures 18-19
	22. T-beams & Slabs	Read: Text 13.4-13.5; note set 21.1
12	23. Shear, Torsion, Reinforcement & Deflection	Read: Text 13.6-13.8; note sets 21.1 & 23 Due: Assignment 11 over material from lectures 20-21
	24. Floor Systems & Continuous Beams	Read: Text 14; note sets 21.1 & 24.1 Reference: <i>note sets 24.2 & 24.3</i> Quiz 6 over material from lectures 16-20
13	25. Columns & Frames	Read: Text 15; note set 21.1 Due: Assignment 12 over material from lectures 22-23
	26. Foundation Design & Footings	Read: Text 3.9 (footing pressure section only), Text 16; note sets 26.1 & 26.2 Due: Project Part II (Cardboard Couch Swing Design)
14	27. Masonry Construction Beams & Columns	Read: Text 15.4; note sets 27.1, 27.2 & 27.3 Due: Assignment 13 over material from lectures 24-25
	28. Shell Systems and Synthesis	Read: Text 4 & 17; note sets 28.1 & 28.2 Due: Final Learning Evaluation Quiz 7 over material from lectures 21-26
FINAL:	1-3 PM Friday, May 3	(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, currently located in the Disability Services building at the Student Services at White Creek complex on west campus 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	http://dept.arch.tamu.edu/
Department Financial Assistance	http://dept.arch.tamu.edu/financial-assistance/
Academic Calendar	http://registrar.tamu.edu/general/calendar.aspx
Final Exam Schedule Online	http://registrar.tamu.edu/Courses,-Registration,-Scheduling/Final-Exam-Schedule
On-Line Catalog	http://catalog.tamu.edu
Student Rules	http://student-rules.tamu.edu/
Aggie Honor System Office	http://aggiehonor.tamu.edu/
Texas Society of Architects	https://texasarchitects.org/
American Institute of Architecture website	http://www.aia.org/index.htm
AIA Brazos (local chapter)	http://www.aiabrazos.org/

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
JANUARY	6	7	8	9	10	11 last day to register	12
	13	14 classes begin	15 Lect 1	16	17 Lect 2	18 last day to add/drop	19
	20	21 King Holiday	22 Lect 3 #1 due	23	24 Lect 4	25	26
	27	28	29 Lect 5 #2 & project due	30	31 Lect 6 Quiz 1	1	2
FEBRUARY	3	4	5 Lect 7 #3 due	6	7 Lect 8	8	9
	10	11	12 Lect 9 #4 due	13	14 Lect 10 Quiz 2	15	16
	17	18	19 Lect 11 #5 due	20	21 Lect 12	22	23
	24	25	26 Lect 13 Quiz 3 & mid-term evaluation due	27	28 Lect 14 #6 due	1	2
MARCH	3	4 mid-term grades due	5 Lect 15 #7 due	6	7 Lect 16 Quiz 4	8 Rowlett Lecture	9
	10	11	12	13 Spring Break	14	15	16
	17	18	19 Lect 17 #8 due	20	21 Lect 18	22	23
	24	25	26 Lect 19 #9 due	27	28 Lect 20 Quiz 5	29	30
	31	1	2 Lect 21 #10 due	3	4 Lect 22	5	6
APRIL	7	8	9 Lect 23 #11 due	10	11 Lect 24 Quiz 6	12	13
	14	15 last day to Q-drop	16 Lect 25 #12 due	17	18 Lect 26 project due	19 Reading Day	20
	21	22 Muster	23 Lect 27 #13 due	24	25 Lect 28 Quiz 7 & final evaluation due	26	27
	28	29 (dead day) Monday classes	30 (dead day) Friday classes	1 Reading Day	2 Final exams	3 1-3 pm 614 FINAL	4
MAY	5	6	7	8	9 Commencement (Fri. and Sat.)	10	11
	12	13 Grades due	14	15	16	17	18
	19	20	21	22	23	24	25