



Course title and number ARCH 614 – Elements of Architectural Structures (section 600)
Term Spring 2014
Meeting times and location Lecture: 8-9:15 am T,R; Lab: 9:25-10:50 am in 403 Langford A (1:40 total)

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 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 be able to identify the configuration, label, behavior, advantages and disadvantages, and interaction of various types of structural members and assemblies with respect to materials (e.g. reinforced concrete beams or frames).
- 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 12:30-2 pm MW, 1-2 pm TR (*and by appointment*)
Office location A413 Langford

Textbook and/or Resource Material

Required Text:

- Simplified Engineering for Architects and Builders, 11th ed., Ambrose & Tripeny, (2011) Wiley, ISBN 978-0-470-43627-1 (hardcopy) or ISBN 978-0-470-91339-0 (digital)

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 14th 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.

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 Monday, May 5.**

Teaching Assistant:

- Victoria Garcia (m2310_3@neo.tamu.edu)

Structures Help Desk:

- Miray Oktem (mrycan@neo.tamu.edu)
- 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 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

Graded work: This typically constitutes 10 quizzes, a learning portfolio (worth 1.5 quizzes) and a final exam (worth 4 quizzes). This equates to proportions of approximately 64% to quizzes, 10% 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. 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/614frame.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. Structural Performance Requirements, Systems, Math and Applied Physics	Read*: Text Introduction (pp. 1-7); note sets 1.1, 1.2 & 1.3 Practice: <i>Math Worksheets</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; note set 3.1 Reference: <i>note set 3.2</i> Solve: Assignment 1 (<i>start</i>)
	4. Response to Forces and Temperature	Read: Text 2.1, 2.2, 3.1; note set 4
3	5. Moments, Rotational Equilibrium & Beam Reactions	Read: Text 1.5-1.7; note set 5 Due: Assignment 1 & Project Part I
	6. Beam Shear and Bending	Read: Text 3.2-3.5; note set 6.1 Reference: <i>note set 6.2</i>
4	7. Semi-graphical Method: Shear and Bending Moment Diagrams	Read: note set 6.1 Reference: <i>note set 6.3</i> Due: Assignment 2
	8. Beam Section Properties	Read: Text Appendix A; note set 8 Quiz 1
5	9. Beam Stresses	Read: Text 3.6-3.7; note set 9 Due: Assignment 3
	10. Other Beams and Pinned Frames	Read: Text 3.8; note sets 10.1 & 10.2 Quiz 2
6	11. Rigid Frames - Compression & Buckling	Read: Text 2.8, 3.9-3.11 (not footing pressure analysis); note set 11.1 Reference: <i>note set 11.2</i> Due: Assignment 4
	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> Quiz 3
7	13. Wood Construction Materials & Beam Design	Read: Text 4.5 & 5 (all); note sets 13.1 & 13.2 Due: Assignment 5
	14. Column Design	Read: Text 6; note set 13.2 Quiz 4
8	15. Joints and Connection Stresses	Read: Text 7; note sets 13.2 & 15 Due: Assignment 6
	16. Steel Construction Materials & Beam Design	Read: Text 4.6 & 8 (all); Text 9.1-9.8; note set 16 Quiz 5
9	17. Trusses, Decks & Plate Girders	Read: Text 9.9-9.12; note sets 16 & 17 Due: Assignment 7
	18. Column Design	Read: Text 10; note set 16 Quiz 6
10	19. Bolted Connections & Tension Members	Read: Text 11; note set 16 Due: Assignment 8
	20. Welds and Light Gage Steel	Read: Text 12; note set 16 Quiz 7
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 9
	22. T-beams & Slabs	Read: Text 13.4-13.5; note set 21.1 Quiz 8
12	23. Shear, Torsion, Reinforcement & Deflection	Read: Text 13.6-13.8; note sets 21.1 & 23 Due: Assignment 10
	24. Floor Systems & Continuous Beams	Read: Text 14; note sets 21.1 & 24.1 Reference: <i>note sets 24.2 & 24.3</i> Quiz 9

Week	Topic	Required Reading/Problems
13	25. Columns & Frames	Read: Text 15; note set 21.1 Due: Assignment 11 & Project Part II
	26. Foundation Design & Footings	Read: Text 3.9 (footing pressure section only), Text 16; note sets 26.1 & 26.2 Quiz 10
14	27. Masonry Construction Beams & Columns	Read: Text 15.4; note sets 27.1, 27.2 & 27.3 Due: Assignment 12
	28. Shell Systems and Synthesis	Read: Text 4 & 17; note sets 28.1 & 28.2 Due: Learning Portfolio

FINAL: **1-3 PM Monday, May 5**

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

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