

ENDS 231. Architectural Structures I

<p>Instructor: Prof. Anne B. Nichols A413 Langford (979) 845-6540 anichols@tamu.edu</p>	<p>Office Hours: 8:30-9:30 am T-F 11:45 am -12:15 pm M-R</p>
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Prerequisites: ENDS 106; MATH 142 or equivalent (linear algebra and calculus); PHYS 201

Catalogue Description: Introduction to the physical principles that govern classical statistics and strengths of materials through the design of timber and steel components of architectural structures; computer applications.

Goals: ENDS 231 is the study of structural design concepts that influence the development of architectural space and form. In all engineering construction, the component parts of a structure must be assigned definite physical sizes, constructed of specific materials and designed to resist various load combinations. The course is divided into two parts: Statics and Strength of Materials. **Statics** is the branch of mechanics that involves the study of external forces and the effects of these forces on bodies or structural systems in equilibrium (at rest or moving with a constant velocity). **Strength of Materials** involves analytical methods for determining the strength, stiffness (deformation characteristics), and stability of the various load-carrying members. Members are designed for specific materials using current national design specifications.

Objective: To understand the significance, assumptions, applications, and limitations of the basic principles of Statics and Strength of Materials as they apply to the design and analysis of structural members and simple connections.

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

Reference: ACI 318-02 Code and Commentary
AISC 3rd ed. Load and Resistance Factor Design
AISC 9th ed. Allowable Stress Design
National Design Specifications for Wood

Timetable: CREDIT 3.0 10:00-11:35 am Lecture M-F
(section 100)

Grading: Assignments & Projects 40%
Quizzes 40%
Learning Portfolio 5%
Final Exam 15%

Letter Grades (Approximate):

90-100.....	A
80-89.....	B
70-79.....	C
60-69.....	D
0-59.....	F

- Policy:**
- 1) **Attendance:** Necessary. Required.* And subject to University Policy. See Part I Section 7 in Texas A&M University Student Rules: <http://student-rules.tamu.edu/>
 - 2) **Lecture, Lab and Textbook:** The lecture slide shows that correspond to the Handouts (see #3) are to be viewed prior to lecture which will be reserved for review. Lab will consist of problem solving requiring the textbook. The lecture shows are available on the class web page, class folder (see #3), and WebCTVista (see #7). An Optional Lab is provided for working assignment problems with help available in a location to be determined.
 - 3) **Handouts:** The handouts are available on the class web page at http://archone.tamu.edu/faculty/anichols/index_files/courses/ends231/index.html, on WebCT (see #7) or in the class folder on \\Xavier\classes\ENDS231100. A full set of notes can be purchased from the TEES copy center located on the second floor of Wisenbaker Engineering Research Lab. They are listed under Anne Nichols, ENDS 231. **COSC 321 notes are NOT EQUIVALENT.**
 - 4) **Assignments and Projects:** Due as stated on the assignment statements. Assignments received after one lecture will be worth 75%. Assignments received after two lectures will be worth 60%. Assignments received after five lectures will be worth 30%, and after six lectures will receive no credit. Assignments with incorrect formatting will be penalized. Projects will not be allowed late credit.

<i>Format:</i>		
Date	Name	Course
Given:		
Find:		
Solution:		
:		
 - 5) **Learning Portfolio:** A learning portfolio is to be assembled by the end of the term to demonstrate what you have learned. It will include 1) a reflective essay and 2) a set of documents that illustrate what is described in the essay including revised work.
 - 6) **Quizzes:** Quizzes will be given at any time during the period. Make-up quizzes without an excuse will not be given. Practice quizzes will be posted electronically.
 - 7) **WebCTVista:** WebCTVista is a web course tool for posting, reading messages and replying as well as recording scores and is accessed with your neo account. This will be used to post questions and responses by class members and the instructor, for posting scores and for e-mail. It can be accessed at <http://elearning.tamu.edu/>
 - 8) **Final Exam:** The final exam will be comprehensive, and is officially scheduled for **10:30-12:30 AM, Monday, July 3.**
 - 9) **Aggie Honor Code:** “An Aggie does not lie, cheat, or steal or tolerate those who do.” The University policy will be strictly enforced. See Part I Section 20 in Texas A&M University Student Rules: <http://student-rules.tamu.edu/> Plagiarism (deliberate misrepresentation of someone else’s work as your own) will be treated strictly according to University policy as outlined by the Office of the Aggie Honor System: <http://www.tamu.edu/aggiehonor/>
 - 10) **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 accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Student Services Building. The phone number is 845-1637. Also contact Prof. Nichols at the beginning of the semester.

Lecture	Text Topic	Articles/ Problems
1.	Basic Concepts and Principles	Read: Text Chap. 1, Appendix B; note sets 1-2
2.	Forces	Read: Text 5.1, 2.1–2.3; note set 3 Prequiz
3.	Moments	Read: Text 2.4; note set 4 Solve: Assignment 1
4.	Equilibrium of a Particle	Read: Text 3.1; note set 5
5.	Free Body Diagrams Support Conditions	Read: Text 3.2, 4.3; note set 6 Quiz 1
6.	Introduction to Trusses Method of Joints	Read: Text 4.1 (89-87); note set 7
7.	Trusses – Method of Sections	Read: Text 4.1 (89-110); (note set 7) Solve: Assignment 2
8.	Pinned Frames & Hinged Arches	Read: Text 4.2; note set 8
9.	Distributed Loads on Beams, Concentrated Loads Load Tracing	Read: Text 3.3, 5.2-5.3; note set 9 Quiz 2
10.	Structural Properties of Areas - Centroids	Read: Text 7.1; note set 10 Solve: Assignment 3
11.	Structural Properties of Areas –Moment of Inertia	Read: Text 7.2-7.4; note set 11 Project due
12.	Beam Forces	Read: Text 8.1-8.2; note set 12 Solve: Assignment 4
13.	Shear and Bending Moment Diagrams	Read: Text 8.3-8.4; (note set 12)
14.	Material Properties – Stress & Connections	Read: Text 6.1; note set 13 Quiz 3
15.	Material Properties – Strain, Strength and Elasticity	Read: Text 6.2-6.3; note set 14 Solve: Assignment 5
16.	Torsion Stress and Thermal Strain	Read: Text 6.4; note set 15
17.	Stresses in Beams – Bending, Shear & Connectors	Read: Text 9.1-9.4; note set 16 Solve: Assignment 6
18.	Beam Deformation & Design	Read: Text 9.5-9.6; note set 17
19.	LRFD Steel Design – Beams	Read: note set 18 Quiz 4

Lecture	Text Topic	Articles/ Problems
20.	Stability of Structures & Design	Read: Text 10.1-10.2; note set 19 Solve: Assignment 7
21.	Column Design – Wood, Steel & LRFD Steel	Read: Text 10.3-10.4; note set 20
22.	Design of Eccentrically Loaded Columns	Read: Text 10.5; note set 21 Solve: Assignment 8
23.	Tension Members and Connections - Steel	Read: note set 22 Learning Portfolio due
24.	Rigid and Braced Frames	Read: note set 23 Quiz 5 Solve: Assignment 9
	Final Exam Period	Exam

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
MAY	21	22	23	24	25	26 last day to register	27
	28	29 Memorial Day	30 Lect 1 session I classes begin	31 Lect 2 PRE-QUIZ	1 Lect 3 ASSIGN. 1 due	2 Lect 4 last day to add/drop	3
JUNE	4	5 Lect 5 QUIZ 1	6 Lect 6	7 Lect 7 ASSIGN.2 due	8 Lect 8	9 Lect 9 QUIZ 2	10
	11	12 Lect 10 ASSIGN.3 due	13 Lect 11 PROJECT due	14 Lect 12 ASSIGN.4 due	15 Lect 13	16 Lect 14 QUIZ 3	17
	18	19 Lect 15 ASSIGN.5 due last day to Q-drop	20 Lect 16	21 Lect 17 ASSIGN.6 due	22 Lect 18	23 Lect 19 QUIZ 4	24
	25	26 Lect 20 ASSIGN.7 due	27 Lect 21	28 Lect 22 ASSIGN.8 due	29 Lect 23 Portfolio due	30 Lect 24 QUIZ 5 ASSIGN.9 due	1
JULY	2	3 Final exams 10:30-12:30pm 231 FINAL	4 4 th Holiday	5 session II classes begin	6	7 session I grades due	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
AUGUST	6	7	8	9 end of summer terms	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25 Registration	26
	27	28 classes begin	29	30	31	1	2