

**ARE 362L Structural Design in Wood
Spring 2009
Department of Civil, Architectural, and Environmental engineering
University of Texas at Austin**

SYLLABUS

- UNIQUE NUMBER:** 14815
- INSTRUCTOR:** Prof. Dan L. Wheat
ECJ 4.714
E-mail: dwheat@mail.utexas.edu
- OFFICE HOURS:** M: 2:00-3:00; W: 2:00-4:00. **Please e-mail to arrange an appointment if you cannot make it at these times.**
- TA/GRADER** Kaitlyn Cheesebro
ECJ 4.302 [near elevators]
Office hours: TBA
- COURSE TIME:** Lecture: MWF* 9:00 a.m.-10:00 a.m.; Lab: F 2:00 p.m.-4:00 p.m.
***Friday lectures will be held only to accommodate possible travel when either a Monday or a Wednesday lecture has to be cancelled because of travel. On several selected Fridays, graduate students may have a separate seminar session with the instructor.**
- PLACE:** Lecture: ECJ 6.406; Lab: ECJ 6.406
- OBJECTIVES:** This course is designed to: 1) introduce the student to the behavior and design of simple wood members and systems; 2) strengthen the student's ability to visualize the geometry and behavioral characteristics of two- and three-dimensional structures.
- Course Description from the 2008-2010 Catalog:** Engineering properties of wood; design of glued-laminated and lumber structural members, connections, and simple systems; introduction to shear walls and diaphragms. Five hours of lecture and supervised work a week for one semester.
- PREREQUISITES:** CE 329 Structural Analysis
- COMPUTER:** Proficiency with computers and familiarity with a spreadsheet program, or Matlab or Mathcad.
- TEXT:** Design of Wood Structures: ASD/LRFD, by Breyer, et al., 6th edition, McGraw Hill
ISBN-13: 978-0-07-145539-8.

Required code: 2005 National Design Specification for Wood Construction, and Supplement Order at <http://www.forestprod.org/awc/index.html>, click on *student*. In order to minimize shipping charges [about \$10.00 for individual orders], you can order in groups, the larger the better.

Also required, but free downloads at <http://www.awc.org/Publications/download.html>
[Scroll down and look for items in green].

- [2005 NDS Commentary](#)
- [2005 NDS Supplement Design Values for Wood Construction](#)
- [Supplement - 2005 ASD / LRFD Wind / Seismic](#)

Other materials (e.g., homework solutions) will be put on the library's reserve web site: <http://reserves.lib.utexas.edu/eres/courseindex.aspx?&page=search>. This site should be consulted regularly for course announcements, homework assistance and/or commentary, and any other course-related information.

REFERENCE: Forest Products Laboratory. 1999. Wood Handbook--Wood as an Engineering Material. Gen. Tech. Rep. FPL-GTR-113. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 463 p. [<http://www.fpl.fs.fed.us/documnts/FPLGTR/fplgtr113/fplgtr113.htm>]

E-Mail: You are expected to check your e-mail regularly for class announcements. In order to insure that you get all e-mail, it is suggested that you use the [.utexas.edu](http://utexas.edu) instead of hotmail, etc.

CLASS FORMAT: Lectures supplemented with outside reading, homework, and exams.

GRADING:

Homework	10%
Exam #1 (February 20 th)	25%
Exam #2 (April 3 rd)	30%
Final Exam (May 18 th)	35%

Grades A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: < 60

The instructor reserves the right to lower these cut-offs slightly, but students should not assume that will happen.

HOMEWORK POLICY:

Homework must be done on engineering paper and it must be neatly done. Papers must be creased vertically and stapled. Your name must be written on the outside of the HW packet. Neatness: Engineering calculations are to be organized and neatly done because the intended audience is usually another engineer or perhaps even another engineering firm. Figures must accompany any set of engineering calculations and it is expected that your HW will contain ample figures to aid in explaining the details of the calculations. Homework will be due at the beginning of class on the due date. Some assignments will require MATHCAD, a tutorial for which will be given in a lab session. In most of these assignments using MATHCAD, a pre-developed template will be provided; students will be given problems that will require modification of the template.

COMMENTARY ON HOMEWORK: In some semesters there may be several students who elect to do little or no homework. This can result in the loss of a full letter grade. It is a wiser to do all homework in a timely manner and to do it in a professional way. A surprising number of students have a composite average at the end of the course that places them near a grade boundary. Quality homework is one way to get the benefit of the doubt in these cases.

Homework assignments generally will be 20 points:

18-20 points: Neatly done; organized; mathematically accurate; good synthesis of concepts/principles; all problems worked.

16-18- points: Neatly done; organized; some mathematical inaccuracies; good synthesis; all problems worked.

14-16- points: Generally neat; generally organized; some mathematical inaccuracies; adequate synthesis, but needs improvement; all problems worked.

12-14- points: Hastily done [looks copied], questionable organization; mathematically questionable; little synthesis; missing problem(s).

<12 points: Generally incomplete; hastily done; no synthesis; missing problems.

EXAMINATIONS: There will be two examinations and a final examination. Each examination will be closed book, but open codes, and will be given on the date indicated in **GRADING** above. Missed examinations may be made up only if the reason for missing was illness or some other emergency. In the unusual event that you must miss an exam, you must notify the instructor before the beginning of the exam. Otherwise, you will receive a zero for that exam. The make-up exam will be an oral exam covering concepts and theory.
The Final Exam will be given on Tuesday May 19th, 9:00 a.m.-noon.

EVALUATION: The University Measurement and Evaluation Center forms will be used during the last week of class to evaluate the course and the instructor.

DISHONESTY: The strictest interpretation of University procedures will be followed in dealing with cases of suspected scholastic dishonesty. Reminder: copying homework is a form of scholastic dishonesty. **Cell phones must be out of sight and reach during exams.** Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site <http://deanofstudents.utexas.edu/sjs/>, and the General Information Catalog information at <http://registrar.utexas.edu/catalogs/gi08-09/app/gi08.appc03.html#chapter-11-student-discipline-and-conduct>.

ATTENDANCE: Regular class attendance is expected in accordance with The University's General Information catalog and the College of Engineering policy (see the section on Attendance in the Undergraduate Catalog). We do not take role in this class, but it will be assumed that you have attended all lectures and labs.

DEPORTMENT: It is appropriate conduct and it is a courtesy to everyone in the class for you to come to class on time in order to avoid disruptions. Proper conduct also precludes eating, drinking, talking, and walking around during class. **Please turn off cell phones before class and keep them out of sight during class.** A congenial and pleasant learning environment is essential for all of us. **We will maintain a high level of professional behavior in the conduct of this class.**

TUTORIAL OPTIONS: Texts with lower levels of presentation are available in the Engineering Library and can be recommended as needed.

IMPORTANT NOTE: The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. Any student with a documented disability (physical or cognitive) who requires academic accommodations should contact the Services for Students with Disabilities area of the Office of the Dean of Students at 471-6259 as soon as possible to request an official letter outlining authorized accommodations. For more information, contact that Office, or TDD at 471-4641, or the College of Engineering Director of Students with Disabilities at 471-4321.

SPECIFIC COURSE OBJECTIVES: Course objectives are embodied in the following: learn how to perform accurate code-related design calculations; integrate old knowledge and new knowledge; gain enhanced skills at two- and three-dimensional visualization; network with fellow classmates, but do your own work; unify mechanics of solids concepts and design concepts; memorize little, comprehend a lot.

IMPORTANT DATES: Undergraduate students: From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund if eligible. From the 13th through the 20th class

day, an automatic Q is assigned, no refund; approval from the Dean and departmental advisor is required. From the 21st class day through the mid-semester deadline, approval is required from the Dean, instructor of the course and departmental advisor.

Graduate students: From the 1st through the 4th class day, graduate students can drop a course via the web and receive a refund. During the 5th through 12th class day, graduate students must initiate drops in the department that offers the course and receive a refund. After the 12th class day, no refund is given. No class can be added after the 12th class day. From the 13th through the 20th class day, an automatic Q is assigned with approval from the Graduate Advisor and the Graduate Dean. From the 21st class day through the last class day, graduate students can drop a class with permission from the instructor, Graduate Advisor, and the Graduate Dean. **Students with 20-hr/week GRA/TA appointment or a fellowship may not drop below 9 hours.**

TOPICS: [Some topics and readings may change]

- **Material properties of wood, grading, wood products** [Text: Chapters 4 and 5]
[Graduate students will study orthotropic elastic properties of wood.]
- **Loads** [Text: Chapter 2, sections 2.1- 2.4, 2.10-2.12; class notes]
- **Design philosophy** [Class notes]
- **Pure tension and compression** [Text: Chapter 7, sections 7.1 - 7.3; class notes]
- **Beam design and behavior for bending, bearing, shear, deflection** [Text: Chapter 6, sections 6.1-6.2, 6.4-6.13; class notes]
- **Beam design for lateral stability** [Text: Chapter 6, sections 6.3, 6.14-6.18; class notes]
[Graduate students will study the differential equations associated with lateral stability.]
- **Column design and behavior** [Text: Chapter 7; class notes]
- **Nailed joints** [Text: Chapter 11, Chapter 12, sections 12.1 through 12.7, 12.12, NDS Commentary Table C11.1.5.6; class notes]
- **Bolted joints** [Text: Chapter 11, Chapter 13, sections 13.1-13.10; class notes]
- **Structural panels** [Text: Chapter 8; class notes]
- **Diaphragms** [Text: Chapter 2, sections 2.10-2.12 – In Chapter 2, do not concentrate on example problem details; instead focus on where loads are applied and their directions; Chapter 9, sections 9.1-9.7, 9.9; class notes]
[Graduate students will study collectors, diaphragm deflections, and rigid diaphragms]
- **Shear walls** [Text: Chapter 10, sections 10.1-10.6, 10.8-10.10; class notes]
[Graduate students will study perforated shear walls.]