CE 528 Structural Design in Wood
Spring 2016

This course will be recorded and will be available via the internet to all enrolled students. These recordings may contain images of you as you participate in the class. Please notify Dr. Linda Krute, Director of Distance Engineering Education Programs (ldkrute@ncsu.edu) if you do not want your image to be included in the recordings. If Dr. Krute does not hear from you by the end of the first week of class, it will be assumed that you are in agreement with this policy.

Instructor: J. M. Nau, PhD, PE, Professor
401C Mann Hall email: nau@ncsu.edu office phone: 515-7737

Office Hours: 1:30-3:00 MTWH. There may be occasions, however, when I cannot keep these office hours. Please feel free to send an email at any time. I routinely monitor email throughout the day, evenings, and weekends. I have also set up a message board on the course website that you are encouraged to use to communicate with the entire class. I will monitor it regularly as well.

Prerequisites: CE 325 (structural analysis) and graduate standing. Undergraduates require departmental permission.


Minimum Design Loads for Buildings and Other Structures, ASCE 7-10, American Society of Civil Engineers, Reston, VA, 2010. Required portions will be available on the course website.

Website: http://courses.ncsu.edu/ce528/
Course Objectives:

The course covers the complete design of wood buildings, except for the foundations. In addition, the principles of member design and diaphragm design apply to other wood structures, such as falsework and concrete formwork. By the end of the course, the student will be able to:

1. Determine gravity and lateral design loads (from ASCE 7-10 and IBC 2012),
2. Design structural elements and subassemblies for vertical loads (tension members, compression members, and beams), and
3. Design structural elements and subassemblies for lateral forces (beam-columns, horizontal diaphragms, and shearwalls).

Course Outline:

The book selected for the course was written either as a text or as a reference for systematic self-study of the subject. The course will cover the first ten chapters of the text, which are organized as they are encountered in design practice. The design of connections is introduced by reviewing the content of chapters 11 through 14:

1. Wood Buildings and Design Criteria
2. Design Loads
3. Behavior of Structures under Loads and Forces
4. Properties of Wood and Lumber Grades
5. Structural Glued Laminated Timber
6. Beam Design
7. Axial Forces and Combined Bending and Axial Forces
8. Wood Structural Panels
9. Diaphragms
10. Shearwalls
11-14. Review of chapter content related to the design of connections

Grading:

Homework: 30% (9 assignments with one due the last week of class)
Tests: 2@15% (Thursday March 3 and Thursday April 7)
Final Exam: 40% (Thursday April 28, 8-11 am)

The two tests and final exam are open book. All course materials may be used. Make-up tests will not be given for any reason. If one test is missed, the final exam counts 55%; if both tests are missed, the final exam counts 70%.

Grading Scale:

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<th>Grade</th>
<th>97-100</th>
<th>93-96.9</th>
<th>90-92.9</th>
<th>87-89.9</th>
<th>83-86.9</th>
<th>80-82.9</th>
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<th>70-72.9</th>
<th>67-69.9</th>
<th>63-66.9</th>
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**Conduct of the Course:**

The course will move at a relatively rapid pace, especially the portions dealing with vertical loads, the properties of wood and wood products including sawn lumber, glued laminated timber, plywood, and oriented strand board. It is expected that students will do the required reading in the text ahead of the brief class discussions on these topics. Class time will focus on the calculation of lateral loads (wind and seismic) and the solution of a variety of design examples according to the National Design Specification for Wood Construction (NDS). Allowable stress design (ASD) provisions will be used since wood design in practice continues to follow this approach.

**Homework Policies:**

1. Homework will normally be assigned on Thursday and is due one week from the following Tuesday, i.e., 12 days later. For example, homework 1 is assigned on Thursday January 7 and is due Tuesday January 19. Late homework will not be accepted.

2. Working on homework in teams is optional. Some assignments may be completed individually, and some may be completed in teams. Any number of students may work together as the assignment is completed; however, teams of no more than two (2) members may submit a single group solution. One team member is the “recorder” and the other is the “checker.” Each page must have title block at the upper right with the following information:

   Page ___ of ___  
   Recorder initials: ______  
   Checker initials: ______  

   Note that recording and checking duties must be shared approximately equally throughout the semester. If one team member is the recorder for an entire assignment, the other team member must be the recorder for the next assignment.

3. Each assignment must have a cover page with the following information: Course number and title, homework assignment number, and the typed names of team members. In addition, signatures of the team members must be under the following two statements:

   (a) “We, the undersigned, agree that we have each contributed equally to this assignment.”  
   (Of course, this statement will not appear on an assignment completed individually.)

   (b) “We (or I if submitted individually), the undersigned, have neither given nor received unauthorized assistance on this assignment.”

4. Homework solutions will not be provided, but all questions will be answered.

**Homework Standards:**

1. Use high quality paper, preferably scaled engineering paper. Paper with ragged edges, i.e., torn from a notebook, will not be accepted.
2. Provide a brief problem statement and appropriate sketches. Copying the entire problem statement from the text or handout is not required. All sketches, free body diagrams, etc. must be drawn neatly and clearly, approximately to scale, using a straight edge.

3. Show all work in a neat and orderly fashion. All final and intermediate numerical results must be accompanied by the proper units.

4. Clearly identify the final results by enclosing answers within boxes or by double underlining. Some problems may require one or more sketches or plots.

**Attendance Policy:**

Regular class attendance is expected, and all students are responsible for all material presented in class. See http://policies.ncsu.edu/regulation/reg-02-20-03

**Academic Integrity Statement:**

Students will adhere to the academic policy set forth by the University Code of Student Conduct. See http://policies.ncsu.edu/policy/pol-11-35-01

Plagiarism and cheating are attacks on the very foundation of academic life, and cannot be tolerated within universities. Section eight (8) of the Code defines academic dishonesty and provides information on potential sanctions for violators of academic integrity. You will be asked to sign the following statement on each test and the final: “I have neither given nor received any unauthorized assistance on this test.”

**Students with Disabilities:**

Reasonable accommodations will be made for students with verifiable disabilities. See http://dso.dasa.ncsu.edu/

In order to receive available accommodations, students must register with Student Health Services, 2815 Cates Avenue, Suite 2221, Campus Box 7509, Raleigh, NC 27695-7509; office hours: 8:00 AM to 5:00 PM Monday through Friday; phone 919.515.7653 (voice/TTY); 919.513.2840 (fax); email: disability@ncsu.edu

For more information on NC State’s policy on working with students with disabilities, see http://policies.ncsu.edu/regulation/reg-02-20-01
This addendum applies only to those students registered for the online section 601. The following procedures DO NOT apply to those registered for the on-campus section 001.

**Homework**

Please send all homework to the NC State Engineering Online Homework Coordinator. Homework is accepted as a scanned .pdf file or by fax. Please use the cover page found here:

http://engineeringonline.ncsu.edu/online_courses/forms.html

Please make sure that your writing is bold so that the fax or printed scan is clear and legible. It is essential that you email or fax your homework no later than 4 pm on the due date to ensure that it has been received in good order. Homework assignments will be delivered to me and will be returned to you after they have been graded.

**Tests and Final Exam**

The two 75-minute tests and the 3-hour final exam must be proctored. Engineering Online students must submit the name of an individual to serve as a proctor to the EOL office within the first two weeks of the semester. The Proctor Identification Form may be found here:

http://engineeringonline.ncsu.edu/online_courses/forms.html

Complete the form and submit it. You will be notified of the approval or disapproval status of the individual to serve as your proctor.

Proctors will receive and administer the tests and final exam according to the schedule in the syllabus. Proctors will receive detailed instructions along with the tests and final exam.