

CE 598: Design of Wood and Masonry Structures

Course Outline

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Course web link: http://civilx.unm.edu/Courses/CE_598wm/CE_598wm.htm

Instructor	<p>Dr. Timothy Ross, PE, Tapy Hall, Room 216; Ph: 277-3459 Dr. Mahmoud Reda Taha, P. Eng, Tapy, Room 124; Ph: 277-1258 e-mails: ross@unm.edu & mrtaha@unm.edu</p>
Lectures	<p>Twice: Monday and Wednesday 5:30 to 6:45PM Mechanical Engineering 220</p>
Lecture Notes; other information	<p>- Lecture notes and other course information will be distributed by the instructors and will be available on the internet on the course website: http://civilx.unm.edu/Courses/CE_598wm/CE_598wm.htm - Lecture notes are made to compliment other course materials. Students are supposed to read both the lecture notes and the parts of other references that cover the subjects discussed by the instructors.</p>
Office Hours	<p>Ross: Monday and Wednesday 10 am – 11:45 am or by appointment Taha: Monday and Wednesday: 4pm-5pm</p>
Learning Objectives	<p><u>After completing this course the student shall be able to</u></p> <ol style="list-style-type: none"> 1- Explain principles of masonry materials 2- Compute load and materials factors for masonry and wood structures. 3- Explain the main characteristics of masonry assemblage behavior 4- Design of masonry elements under flexural/axial loads including <ol style="list-style-type: none"> a- Determining the required amount of reinforcement b- Check shear and anchorage strength of reinforced masonry c - Check serviceability limits of masonry beams and walls 5- Design of masonry walls/columns under combined axial and bending loads. 6- Design of masonry arches 7- Understanding factors affecting wood assemblage 8- Design of wood joists and beams 9- Design of wood diaphragms 10- Design of wood columns 11- Design of wood connections
Expected Outcomes (In accordance with Civil Engineering Departmental Goals)	<ul style="list-style-type: none"> • This course contributes to the following educational outcomes in the objectives of the CE Department: • A familiarity with the modern tools for engineering analysis, including computers and sophisticated laboratory equipment. • An ability to approach and solve engineering problems in a structured manner. • Synthesis of knowledge from various sources to produce creative, cost-effective designs for civil engineering facilities. • A commitment to become registered as professional engineers. • An ability to communicate effectively, both in written and oral forms, as well as an ability to listen. • A sensitivity to practice personal and professional ethics.

- A basic understanding of societal and environmental issues as they affect engineering decisions

References

There is no single textbook for use in the course. Here are some useful references.

- ASCE 7: American Society of Civil Engineers, 2006. Minimum Design Loads for Buildings and Other Structures (ASCE 7-05), Reston, VA
- Masonry Structures: Behavior and Design: Drysdale et al. 2005.
- Masonry Standard Joint Committee (MSJC) - 2005
- Design of Wood Structures ASD/LRFD, 6th Edition, Breyer, et. al., 2007.
- Designing with Wood: The Basics, Auburn University Video, 2006
- Designing with Wood: LRFD, Auburn University Video, 2006

Assignments

- A list of all assignments and their due dates are listed below

The following rules apply to all assignments:

- All assignments represent 20% of the total course grade.
- Assignments shall be delivered by the due date or will be marked off a maximum of 50%.
- Assignments delayed more than one week will not be accepted.

Course Project

A reinforced masonry or wood design project is expected from all students. The project will include providing a design of a masonry or a wood structure including performing the basic design calculations and providing basic design drawings. Projects will be provided and groups will be allowed to choose their project. The group will present their project at the end of the semester. Up to three students can collaborate as a team. Further details will be provided by the instructor. The project represents 25% of the total grade.

Expected performance

Students are expected to be familiar with computer programs for structural analysis (e.g. SAP 2000 and/or ANSYS). Students shall also get familiar with engineering-programming environments such as MATLAB, MathCad and Excel. Examples in these programs will be used. It is the duty of the student to get familiar with these programs. Feel free to ask the instructor if you have questions in these programs.

Grading

Component	% Final Grade
Assignments	20
Exam 1 – Masonry	25
Exam 2 - Wood	25
Course Project	25
Class participation	5

CE 598 Course Syllabus - Tentative Schedule

#	Date	Topic
1	Wed. Jan. 23	Masonry Materials
2	Mon. Jan. 28	Masonry Materials – Design Philosophies (LFRD)
3	Wed. Jan 30	Design Philosophies (LFRD)
4	Mon. Feb. 4	Behavior of Masonry Assemblage
5	Wed. Feb. 6	Behavior of Masonry Assemblage
6	Mon. Feb. 11	Design of Masonry Beams/Lintels
7	Wed. Feb. 13	Design of Masonry Beams/Lintels
8	Mon. Feb. 18	Design of Masonry Walls - Out of plane Bending
9	Wed. Feb. 20	Design of Masonry Walls - Out of plane bending
10	Mon. Feb. 25	Design of Masonry Bearing Walls – Axial and Bending
11	Wed. Feb. 27	Design of Masonry Bearing Walls – Axial and Bending
12	Mon. Mar. 3	Design of Masonry Shear Walls
13	Wed. Mar. 5	Design of Masonry Shear Walls
14	Mon. Mar. 10	Design of Masonry Arches
15	Wed. Mar. 12	Design of Masonry Arches
---	Mon. Mar. 17	Spring Break
---	Wed. Mar. 19	Spring Break
---	Mon. Mar. 24	Exam 1 : Design of Masonry Structures (2 hours)
16	Wed. Mar. 26	Design Loads based on ASCE 7-05
17	Mon. Mar. 31	Behavior of Structural systems
18	Wed. Apr. 2	Properties of Wood
19	Mon. Apr. 7	Properties of Wood
20	Wed. Apr. 9	Various Design Factors for Wood
21	Mon. Apr. 14	Laminated wood
22	Wed. Apr. 16	Beam Design
23	Mon. Apr. 21	Beam Design Problems
24	Wed. Apr. 23	Design for axial loads (wood columns)
25	Mon. Apr. 28	Design of wood panels
26	Wed. Apr. 30	Design of wood diaphragms
27	Mon. May 5	Design of wood connections
28	Wed. May. 7	Wood connection details
---	Mon. May 12	Course Project Presentation
---	Wed. May 14	Exam 2: Design of Wood Structures (2 hours)