Architecture 544
Tu Th 8:30 – 10:00
Rm. 2210 Art & Arch. Bldg.

Winter 2022
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Wood Framing (3)
Syllabus

CATALOG DESCRIPTION
Timber as material, properties. Framing with wood (light wood framing, heavy timber framing, laminated timbers). Design and selection of components. Connections of elements (nailing, bolting, timber connectors). Lateral loads and response thereto are also studied. Prerequisite: Arch 324 or equivalent.

OBJECTIVES
Students are familiarized with analysis and design of wood structures using the NDS-ASD code as well as load calculation based on ASCE – 7 (including dead, live, wind and snow load calculation). In addition techniques used to design with modern wood engineered products are explored. Topics covered include: sawn lumber, Glulam, LVL, I-joists, CLT, plywood panels, and stressed skin elements. The students will also explore architectural examples of contemporary wood design using case studies.

ORGANIZATION
The course is lecture based, and the concepts and procedures are taught in this context with classroom and homework problems solved by the students. The presentation is hybrid. Physical presents is not required. All lectures and material will be posted on the course website and Canvas. Computer facilities, including software, are available for supporting computational work in the BT-Lab. Testing equipment and tools are also available for the construction project.

EVALUATION
Evaluation is based on a series of online problems (approximately one per week); Weekly quizzes on Canvas; a group computer analysis project using STAAD.Pro; and a special project (student's choice). Grades are assigned according to the number of points achieved during the semester:

11 topic quizzes 30pts each	330
11 homework problems, 5pts/ question	840
STAAD project	200
Class project	200
TOTAL	1570

The point scale relates to a full range of letter grades assigned as follows:

A+	1518	A	1465	A-	1413
B+	1361	B	1308	B-	1256
C+	1204	C	1151	C-	1099
D+	1047	D	994	D-	942
		E	941 and below		

By University policy the minimum passing grade is a D (994). The highest recorded grade in Architecture is an A. For graduate students C- (1099) is required to pass.

HOMEWORK PROBLEMS
A set of homework problems covering the primary aspects of the course is given to each student. Each student will have a unique set of problems to solve. Students submit solutions online for scoring. Each problem may be worked up to 2 times (2 different data sets) for credit. The best score from **one** of the 2 trials will be recorded. Late problems will be penalized at -5% per day up to a maximum of -35%. Problems are accessed through the course web site. A FAQ which explains the policy concerning the problems is also posted on the problem page.

TEXTS
The required text is the *NDS-2018* code, available at http://www.awc.org/Standards/nds.html (student price) In addition, a copy of *Design of Wood Structures* by Donald Breyer is available in electronic format on Canvas. Another good resource is *The APA Engineered Wood Handbook* also posted on our Canvas site.

CANVAS QUIZZES
Weekly quizzes are posted on Canvas and are due each Sunday evening. Scores for late submissions are reduced at 5% per day to a maximum of 35% off.

COURSE WEB SITE
Course notes will be maintained through a course web site http://www.umich.edu/~arch544
This will include homework submissions. Some material is also posted on the Canvas site.

COURSE EVALUATION
Online course evaluations will be available at the end of the term. Every student is encouraged to fill out the evaluation. Any comments or suggestions for the ongoing improvement of the course are most welcome.

UNIVERSITY AND SCHOOL SERVICES AND POLICIES

Accommodations for Students with Disabilities

If you think you need an accommodation for a disability, please inform the instructor. Some aspects of this course – including assignments, and in-class activities – may be modified to facilitate your participation and progress. We will work with Services for Students with Disabilities to determine appropriate academic accommodations. We will treat any information you provide as private and confidential.

Taubman College Academic and Professional Student Conduct Policies

These policies apply to all Taubman College students as well as non-Taubman College students who take courses within the college. As stated in this policy,
"Plagiarism is knowingly presenting another person's ideas, findings, images or written work as one's own by copying or reproducing without acknowledgement of the source. It is intellectual theft that violates basic academic standards. In order to uphold an equal evaluation for all work submitted, cases of plagiarism will be reviewed by the individual faculty member and/or the Program Chair and Associate Dean of Academic Affairs. Punitive measures will range from failure of an assignment to expulsion from the University."

Information on sources for assistance in writing

Students are encouraged to use the University's resources for writing instruction and assistance.
For our multi--lingual students, the ELI faculty offer office hours in our building. Students can seek assistance through the student services team.
The resources of the Sweetland Center for Writing are available for both undergraduate and graduate students. They offer classes, one-on-one assistance in a variety of modalities, and resource guides.
Sweetland Writing Center: http://lsa.umich.edu/sweetland

Link to resource guides (designed for undergraduates, but even grad students might find them useful): http://www.lsa.umich.edu/sweetland/undergraduate/writingguides

Statement on Student Physical Health and Well-being

The health and well-being of faculty, staff, and students is the college's primary focus this academic year. We expect everyone to do their part to keep our community safe. The guidelines listed below are subject to change as public health recommendations evolve. Students will find additional information on the university's Campus Maize and Blueprint website as well as the college's Return to Campus website. Reminders of and changes to these policies and practices will be communicated through our *This Week at Taubman College* weekly emails and monthly *Taubman Together* emails.

- Access to the building will be by MCard only. Please have your MCard with you at all times.
- We ask that you complete the health attestation daily and do not come to the building if you have any of the symptoms or are not feeling well.
- Properly wearing a mask that covers both your nose and mouth while you are on campus (inside or out) is required. Masks are available for free in the Media Center if you need one.

- Students will need to clean shared furniture and equipment after every use; supplies will be provided in each classroom.
- Students are encouraged to minimize their time in the building as much as possible. Visitors are also strongly discouraged.
- The majority of staff will be working remotely to decrease building density, but are still available to assist you. In their absence, the Media Center will act as a central hub and resource for the college community, providing support by answering questions and helping to connect you to appropriate personnel who are working offsite.
- A Google form is available to report concerns with an option to remain anonymous or request someone reach out to you for in-person follow up.

Statement on Student Mental Health and Wellbeing

Taubman College is committed to advancing the mental health and wellbeing of its students. Studies and surveys indicate clearly that a variety of issues, such as strained relationships, increased anxiety, alcohol/drug problems, and depression, directly impact student academic performance. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, please reach out to any of the following for assistance:

- Karen Henry is a CAPS Embedded Psychologist who offers counseling here at Taubman College (karhenry@umich.edu). Note that appointments may take place via phone call or BlueJeans when COVID-19 precautions are in place.
- Counseling and Psychological Services (CAPS) can be reached at (734) 764-8312 and https://caps.umich.edu/ during and after hours, on weekends and holidays. When precautions for COVID-19 are in place, please contact CAPS at caps-uofm@umich.edu or schedule online here: https://caps.umich.edu/article/caps-initial-consultation-request
- For medications, contact University Health Services (UHS) at (734) 764-8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources.
- For an extensive listing of mental health resources available on and off campus, visit: http://umich.edu/~mhealth/.
- To get help right away, if you or someone you know is in a crisis situation, please do one of the following: Call 911 or Call (734) 996-4747 (U-M Hospital Psychiatric Emergency).

Statement on Diversity, Equity, and Inclusion

Taubman College affirms the principles of diversity, equity, and inclusion as we organize resources and priorities that align with our values. We seek to have a diverse group of persons at all levels of the college - students, faculty, staff and administrators - including persons of different race and ethnicity, national origin, gender and gender expression, socioeconomic status, sexual orientation, religious commitment, age, and disability status. We strive to create a community of mutual respect and trust, a community in which all members and their respective backgrounds, identities, and views are represented without any threat of bias, harassment, intimidation, or discrimination.

Wood Framing (3)

Lecture and Exercise Schedule

DATE	TOPIC	ASSIGNMENT (due dates online)	REFERENCE
JAN 6	Wood Properties-ASD approach		Breyer-Ch.1&4
JAN 11	ASCE-7 – Load Cases and C_D		Breyer-Ch.2 / ASCE7-3&4
JAN 13	Sawn Lumber: Flexure	HW1 – Floor Loads	Breyer-Ch.4 / NDS-3&4
JAN 18	Design of Beams		Breyer-Ch.4 / NDS-3&4
JAN 20	Grid Shells	HW2 – Sawn Lumber Rafters	
JAN 25	LVL, PSL, LSL, **I**-Joists – pt1		APA Lit. / NDS 7&8
JAN 27	LVL, PSL, LSL, **I**-Joists – pt2	HW3 – Sawn Lumber Joists	APA Lit. / NDS 7&8
FEB 1	Box Beams		
FEB 3	Sawn Lumber: Columns	HW4 – Sawn Lumber Beams	Breyer-Ch.7 / NDS-3&4 APA Lit.
FEB 8	Sawn Lumber: stud walls		Breyer-Ch.7 / NDS-3&4
FEB 10	Five Column Types	HW5 – Sawn Lumber Columns	Breyer-Ch.7 / NDS-15
FEB 15	Glulam Beams		Breyer-Ch.5 / NDS-5
FEB 17	CLT floor plates	HW6 – Glulam Beams	CLT Handbook
FEB 22	Intro to FEA and STAAD		
FEB 24	STAAD project in BT Lab (room 1221)		
MAR 1	Winter Break ***** Winter Break ***** Winter Break ***** Winter Break ***** Winter Break *****		
MAR 3	Winter Break ***** Winter Break ***** Winter Break ***** Winter Break ***** Winter Break *****		
MAR 8	Composite (Flitch) Beams		
MAR 10	Graphic Statics	HW7 – Flitch Beams	
MAR 15	Combined Stresses		Breyer-Ch.7 / NDS-3&4
MAR 17	Panels – Plywood & OSB	HW8 – Combined Stresses	Breyer-Ch.8 / NDS-9
MAR 22	Diaphragms		Breyer-Ch.9 / NDS-9
MAR 24	Shear Walls	HW9 – Diaphragms	Breyer-Ch.10 / NDS-9
MAR 29	Timber Frame		AWC-DCA5-Post Frame
MAR 31			
APR 5	Mechanical Connectors		Breyer-Ch.11-14 / NDS-11-14
APR 7	Mechanical Connectors		Breyer-Ch.11-14 / NDS-11-14
APR 12	student reports		
APR 14	student reports		
APR 19	student reports		