

## ARCHITECTURAL STRUCTURES II

### Syllabus

**Prof. Peter von Buelow**

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office hours:

by appointment

Section 001 9:30-10:30 MW

**Recitation Sections F**

Section 002 8:30-9:30

Section 003 9:30-10:30

Section 004 9:30-10:30

Section 005 9:30-10:30

Section 006 11:30-12:30

**GSI's**

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**CATALOG DESCRIPTION**

This course covers the basic principles of elastic behavior for different materials such as wood, steel, concrete and composite materials, and compares the properties and applications of materials generally. It investigates cross sectional stress and strain behavior in flexure and in shear, and torsion as well as the stability of beams and columns. The qualitative behavior of combined stresses and fracture in materials is also covered. Prerequisite: ARCH 314

**OBJECTIVES**

Students are introduced to the fundamentals of analysis and design of simple structural members in wood, steel, concrete and masonry. Basic code requirements of strength, stability and serviceability are discussed. Both vertical and lateral loads based on ASCE-7 are considered. Principles of composite materials design, structural continuity, and combined stresses are covered.

**ORGANIZATION**

The course is comprised of lectures (Monday & Wednesday) and a recitation (Friday). The lectures will be posted on the course website and may be watched asynchronously if you cannot attend in person. Lecture attendance is not required. The lectures cover structural concepts and procedures of design using the primary building materials of wood, steel, concrete and masonry. Each Friday the class is broken into smaller recitation sections in which the GSIs review analysis procedures of the various structural elements discussed in the lectures. Recitations may also include an in-class lab assignment. Solutions to homework problems are entered online through the course website. Topics are summarized weekly through Canvas quizzes. In addition, a construction/testing project gives students an opportunity to apply concepts to a physical design. Computer facilities, including software, are available on machines in the building, for supporting computations.

**EVALUATION**

Evaluation is based on an accumulated total number of points. Points are earned based on performance in all course activities – 25 lecture quizzes, 13 Canvas topic quizzes, 12 homework problems, 10 recitation labs, and the tower project. Grades are assigned according to the number of points achieved during the semester:

25 lecture quizzes 10 pts each	250
13 topic quizzes 20 pts each	260
12 homework problems, 5pts/ question	860
tower testing project	250
10 recitation labs, 20 pts each	200
<b>TOTAL</b>	<b>1820</b>

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

A+ 1759	A 1699	A- 1638
B+ 1577	B 1517	B- 1456
C+ 1395	C 1335	C- 1274
D+ 1213	D 1153	D- 1092
	E 1091 and below	

By University policy the minimum passing grade is a D (1153). The highest recorded grade in Architecture is an A. For graduate students C- (1274) 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 3 times (3 different data sets) for credit. The best score from one of the 3 trials will be recorded. Late problems will be penalized at -2% 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.

## **TOWER PROJECT**

A group project to design, construct and test a compression structure will be assigned during the semester. It will be documented with both preliminary and final reports which together count 250 pts. Details are given on the course web site: <http://www.structures.tcaup.umich.edu/project/project.php>

## **TEXT**

Two textbooks are recommended for the course: *Structures* by Schodek and Bechthold, and *Statics and Strength of Materials for Architecture and Building Construction* by B. Onouye and K. Kane (older versions of either are ok – and less expensive). A pdf of the Schodek book and chapters from I. Engel's book are available in Canvas. Additional resources are also posted on the course Canvas site. <https://umich.instructure.com/courses/650412>

## **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.

## **CLASS ATTENDANCE**

In addition to live lectures, all lectures are provided as asynchronous videos. The videos of lectures as well as slides are available on the course website. Each lecture includes a small quiz (to insure attendance) either in person (on paper) or with video (on Canvas). Recitation sections meet each Friday. They include hands-on labs and provide opportunity for questions about homework problems. You must attend in order to do the labs.

## **WEEKLY TOPIC QUIZ**

Weekly Topic Quizzes are posted on Canvas. They are due each Sunday night. The scores for late submissions are reduced at 2% per day. These weekly quizzes cover the material in that week's lectures as well as textbook readings.

## **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](mailto: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](mailto: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](http://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.

### **NAAB Student Performance Criteria**

B.9. Structural Systems: *Understanding* of the basic principles of structural behavior in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems.

### **Statement on Audio and Video Recordings and Protecting Privacy**

The pandemic crisis may require that synchronous class activities be recorded and posted for students who are unable to participate in-person. But recording lectures, discussions, and other similar course-related activities raises important privacy concerns. Instructors must balance the need to include all class members against the need to protect privacy concerns. Recording may stifle discussion and interfere with the free exchange of ideas, particularly when discussing sensitive subjects. Instructors may choose to have some sessions not recorded in order to encourage the free exchange of ideas, or they may choose to pause recording when discussion of sensitive subjects begins. Instructors will share recordings only with members of the class through a platform that is only accessible by members, such as Canvas, to ensure that only members of the class in which the recording was made can access the recording. Faculty should take steps, such as preventing downloading capability, in order to protect the privacy of the members. Recordings and chat sessions are private and cannot be shared outside the classroom. Sharing recordings or chat sessions with anyone outside of the class will be considered academic misconduct. Course activities may be audio or video recorded and made available to other students in this course. As part of your participation in this course, you may be recorded. If you do not wish to be recorded, please contact the instructor the first week of class, or as soon as you enroll in the course, to discuss alternative arrangements. The university provides additional resources on recordings and privacy concerns.