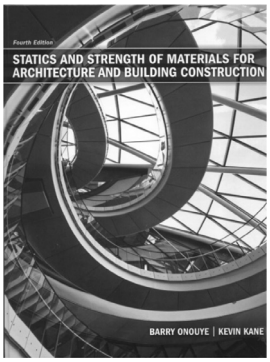
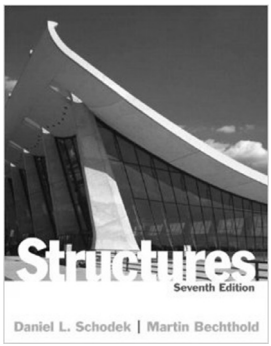
ARCHITECTURE 324

STRUCTURES II



Course Introduction:

Course Syllabus
Course Format
Online Resources



Teaching Staff:

Prof.
Dr.-Ing. Peter von Bülow pvbuelow@umich.edu

GSI's:

002	Elyssa Bakker	elyssab@umich.edu
003	Jessica Duschean	duschean@umich.edu
004	David Lee	ddle@umich.edu
005	Yuyan Wang	yuyanw@umich.edu
006	Kamon Nartnarumit	kamon@umich.edu

Course Syllabus

Organization

- Lecture – Monday & Friday (asynchronous)
- Recitation – Wednesday (synchronous)
- HW Problems – on web
- Topic Quiz - weekly

Evaluation

- 13 Topic Quizzes 260
- 12 HW Problems 855
- Tower Project 250
- 9 Recitation Labs 180

Text

- *Structures* by Schodek
- *Statics and Strength of Materials* by Onouye
- Code material on Canvas
- Web site
  https://www.umich.edu/~arch324

Architecture 324
3 credit hours

http://www.structures.tcaup.umich.edu/
Winter 2022

ARCHITECTURAL STRUCTURES II
Syllabus

Prof. Peter von Buelow
pvbuelow@umich.edu
Office 1205c TCAUP
Phone 763-4931
office hours:
by appointment

Section 001	9:30-10:30 MF	Recitation Sections with GSI's	
Section 002	9:30-10:30	Elyssa Bakker	elyssab@umich.edu
Section 003	10:30-11:30	Jessica Duschean	duschean@umich.edu
Section 004	9:30-10:30	David Lee	ddle@umich.edu
Section 005	10:30-11:30	Yuyan Wang	yuyanw@umich.edu
Section 006	9:30-10:30	Kamon Nartnarumit	kamon@umich.edu

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 & Friday) and a recitation (Wednesday). The lectures will be posted on the course website and may be watched asynchronously if you cannot attend in person. 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 Wednesday 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 in the BT Lab, room 1221, for supporting computations.

EVALUATION

Evaluation is based on an accumulated total number of points. Points are earned based on performance in all course activities – 13 Canvas topic quizzes, 12 homework problems, 9 recitation labs, and the tower project. Grades are assigned according to the number of points achieved during the semester:

13 topic quizzes 20pts each	260
12 homework problems, 5pts/ question	855
tower testing project	250
9 recitation labs, 20pts each	180
TOTAL	1545

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

A+	1494	A	1442	A-	1391
B+	1339	B	1288	B-	1236
C+	1185	C	1133	C-	1082
D+	1030	D	979	D-	927
		E	926 and below		

By University policy the minimum passing grade is a D (979). The highest recorded grade in Architecture is an A. For graduate students C- (1082) is required to pass.

Course Schedule

Lectures

Monday & Friday
video recorded and posted

Recitation

Wednesday with GSI

Homework

course website

Quizzes

Canvas (weekly)

Project

tower
weight and load

Architecture 324 Winter 2022

ARCHITECTURAL STRUCTURES II (3)
Lecture and Assignment Schedule

DATE	TOPIC	Text Reading	PROBLEMS (due dates online)
JAN 5	Course Intro	Onouye, Schodek	
JAN 7	Wood Properties	NDS	
JAN 10	Wood Beams	Schodek 6.4.2	
JAN 12	Recitation **[1-Wood Beams]**		
JAN 14	Wood Beams	Onouye 9.1 - 9.2	
			1. Wood Beam Analysis
JAN 17	**Martin Luther King Day **** No Class **** Martin Luther King Day **** No Class**		
JAN 19	Recitation		
JAN 21	Column Buckling	Onouye 9.4, Schodek 7.4.3	
			2. Wood Beam Design
JAN 24	Wood Columns	NDS	
JAN 26	Recitation **[2-Wood Columns]**		
JAN 28	Cross Laminated Timbers	CLT Handbook	
			3. Wood Column Analysis
JAN 31	Tower Intro - Steel Properties	AISC Onouye 8.7	
FEB 2	Recitation **[3-Steel Beams]**		
FEB 4	Steel Beams	Schodek 6.4.3	
			4 Steel Beam Analysis
FEB 7	Steel Beams	Schodek 6.4.3	
FEB 9	Recitation	**Prelim. Tower Report Due**	
FEB 11	Steel Columns	Onouye 9.3 Schodek 7.4.4	
			5. Steel Beam Design
FEB 14	Steel Columns	Onouye 9.3 Schodek 7.4.4	
FEB 16	Recitation **[4-Steel Columns]**		
FEB 18	Continuous Beams	I. Engel Ch. 17 , Schodek 8	
			6. Steel Column Analysis
FEB 21	Gerber Beams	Schodek 8.4.4	
FEB 23	Recitation **[5-Continuous Beams]**		
FEB 25	"Skyscrapers" David Macaulay video		
			7. Three Moment Theorem
FEB 28	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
MAR 2	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
MAR 4	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
MAR 7	Intro to Concrete – PCA video		
MAR 9	Recitation		
MAR 11	Concrete Beams	Schodek 6.4.4 – 6.4.6	
MAR 14	**Tower Testing **** Tower Testing **** Tower Testing **** Tower Testing ******		
MAR 16	Recitation **[6-Stress vs Strain]**		
MAR 18	Concrete Beams	I. Engel Ch.15	
			8. Concrete Beam Analysis
MAR 21	Concrete Columns	Schodek 7.4.5	
MAR 23	Recitation **[7-Concrete Reinforcing]**		
MAR 25	Composite Sections		
			9. Concrete Beam Design
MAR 28	Masonry Walls	TMS 402	
MAR 30	Recitation		
APR 1	Masonry Walls	TMS 402	
			10. Composite Sections
APR 4	Masonry Walls	TMS 402	
APR 6	Recitation **[8-Lateral Stability]**	**Final Tower Report Due**	
APR 8	Shells and Vaults	Schodek 12	
			11. Masonry Walls
APR 11	Combined Stress	I. Engel Ch. 19	
APR 13	Recitation **[9-Combined Stress]**		
APR 15	Prestress & Post Tension	I. Engel Ch. 19	
			12. Combined Stress
APR 18	no class		

Course Web Site

http://www.structures.tcaup.umich.edu/

Lectures

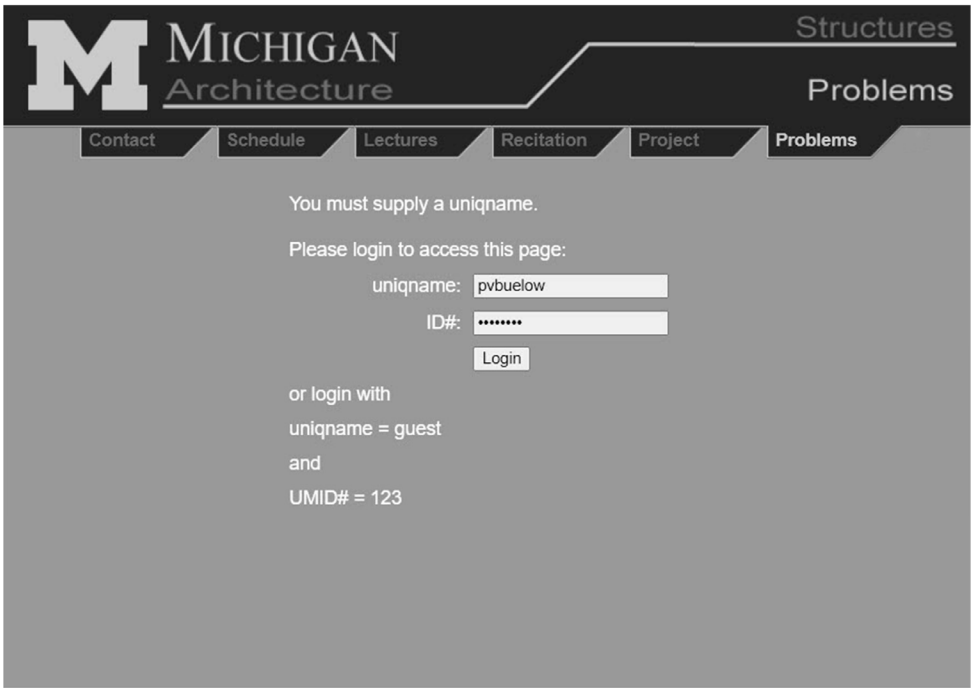
Recitation

Tower Test

Computer Problems

Uniqname

UM ID Number



Computer Problems

Problem Menu

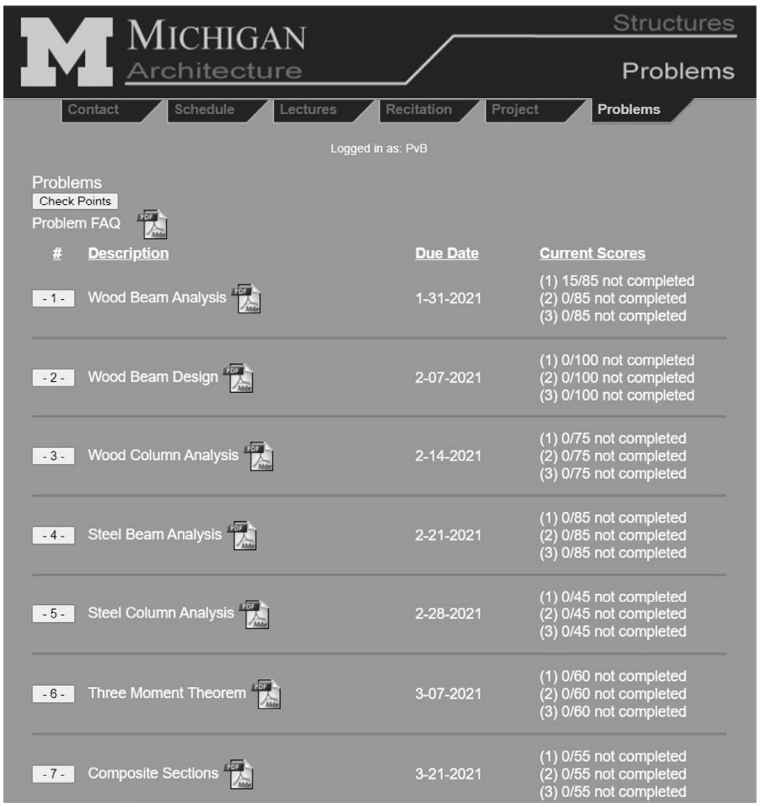
Check Grades

Problem FAQ

Select Problem

Download Instructions

Work Problem (3 versions)



Computer Problems

Problem Page

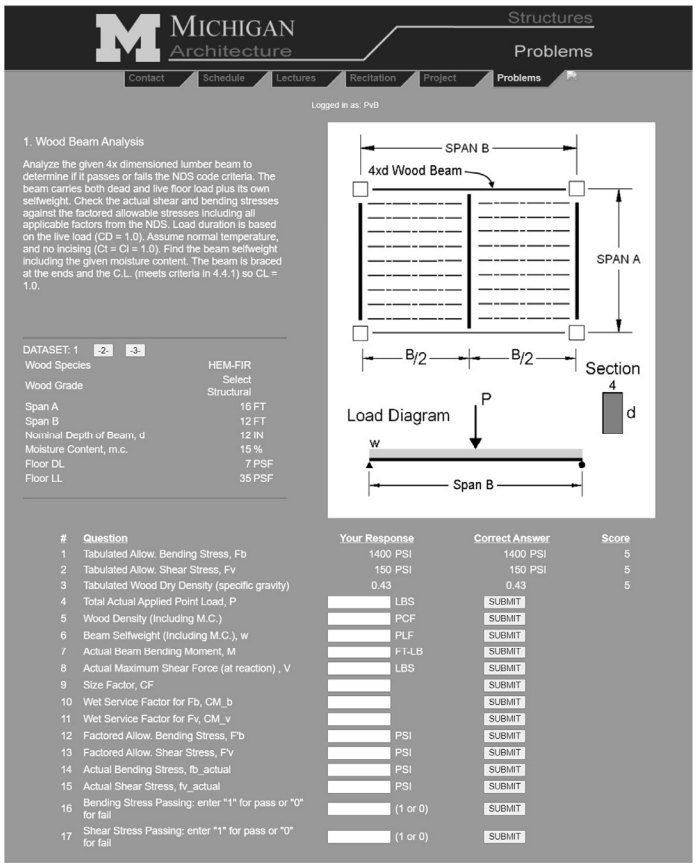
Choose Data Set

Enter Answers

Submit

Read Score

Correct if Necessary



Tips on how engineering students study for exams