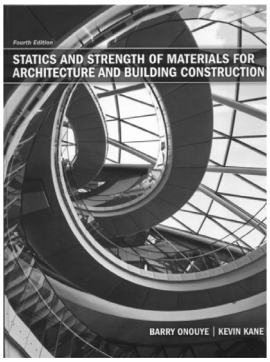
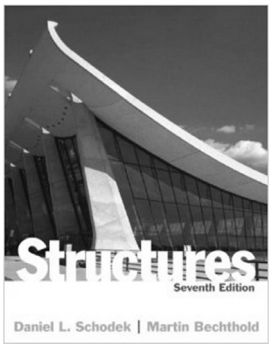
ARCHITECTURE 324

STRUCTURES II



Course Introduction:

Course Syllabus
Course Format
Online Resources



Teaching Staff:

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

GSI's:

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Course Syllabus

Organization

- Lecture – Monday & Wednesday
- Recitation – Friday
- HW Problems – on web
- Topic Quiz - weekly

Evaluation

- 25 Lecture Quizzes 250
- 13 Topic Quizzes 260
- 12 HW Problems 860
- Tower Project 250
- 10 Recitation Labs 200

Text

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

Architecture 324
3 credit hours

http://www.structures.tcaup.umich.edu/
Winter 2024

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 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
TOTAL	1820

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.

Course Schedule

Lectures

Monday & Wednesday
video recorded and posted

Recitation

Friday with GSI

Homework

course website

Quizzes

Canvas (weekly)

Project

tower
weight and load

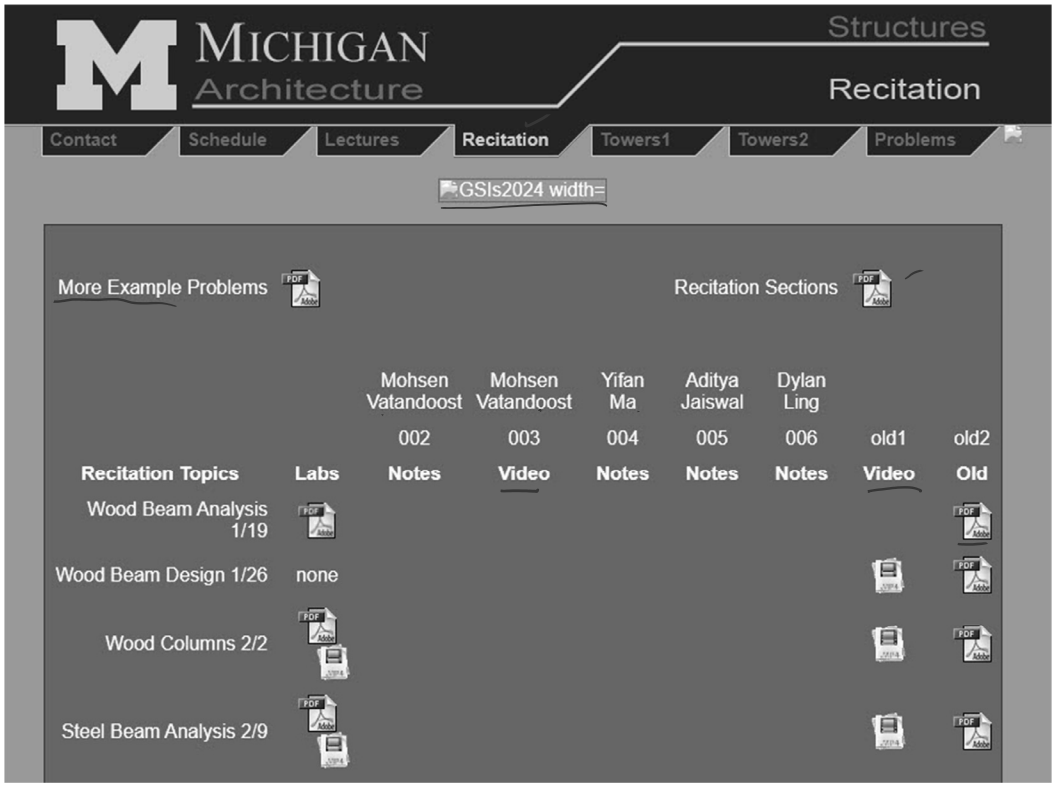
DATE	TOPIC	Text Reading	PROBLEMS (due dates online)
JAN 10	Course Intro	Onouye, Schodek	
JAN 12	Wood Properties	NDS	
JAN 15	**Martin Luther King Day **** No Class **** Martin Luther King Day **** No Class**		
JAN 17	Wood Beam Analysis	Schodek 6.4.2	
JAN 19	Recitation **[1-Wood Beams]**		1. Wood Beam Analysis
JAN 22	Wood Beam Design	Onouye 8	
JAN 24	Column Buckling	Onouye 9.1-9.2 & 9.4, Schodek 7.4.3	
JAN 26	Recitation		2. Wood Beam Design
JAN 29	Wood Columns - Tower Intro	NDS	
JAN 31	Cross Laminated Timbers	CLT Handbook	
FEB 2	Recitation **[2-Wood Columns]**		3. Wood Column Analysis
FEB 5	Steel Properties	AISC, Onouye 8.7	
FEB 7	Steel Beam Analysis	Schodek 6.4.3	
FEB 9	Recitation **[3-Steel Beams]**		4 Steel Beam Analysis
FEB 12	Steel Beam Design	Schodek 6.4.3	
FEB 14	Steel Column Analysis	Onouye 9.3, Schodek 7.4.4	
FEB 16	Recitation **[4-Steel Columns]**		**Prelim. Tower Report Due** 5. Steel Beam Design
FEB 19	Steel Column Design	Onouye 9.3, Schodek 7.4.4	
FEB 21	"Skyscrapers" David Macaulay video		
FEB 32	Recitation		6. Steel Column Analysis
FEB 26	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
FEB 27	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
MAR 1	**WINTER RECESS **** NO CLASS **** WINTER RECESS **** NO CLASS ******		
MAR 4	Continuous Beams	I. Engel Ch. 17, Schodek 8	
MAR 6	Gerber Beams	Schodek 8.4.4	
MAR 8	Recitation **[5-Continuous Beams]**		7. Three Moment Theorem
MAR 11	Intro to Concrete – PCA video.		
MAR 13	Concrete Beams	Schodek 6.4.4 – 6.4.6	
MAR 15	Recitation		
MAR 18	**Tower Testing **** Tower Testing **** Tower Testing **** Tower Testing ******		
MAR 20	Concrete Beams	I. Engel Ch.15	
MAR 22	Recitation **[6-Stress vs Strain]**		8. Concrete Beam Analysis
MAR 25	Concrete Beams		
MAR 27	Concrete Columns	Schodek 7.4.5	
MAR 29	Recitation **[7-Concrete Reinforcing]**		9. Concrete Beam Design
APR 1	Composite Sections	TMS 402	
APR 3	Masonry Walls	TMS 402	
APR 5	Recitation **[8-Composite Sections]**		10. Composite Sections
APR 8	Masonry Walls	TMS 402	
APR 10	Shells and Vaults	Schodek 12	
APR 12	Recitation **[9-Lateral Stability]**	**Final Tower Report Due**	11. Masonry Walls
APR 15	Combined Stress	I. Engel Ch. 19	
APR 17	Combined Stress	I. Engel Ch. 19	
APR 19	Recitation **[10-Combined Stress]**		12. Combined Stress
APR 22	Prestress & Post Tension		

Course Web Site

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

Lectures

Recitation

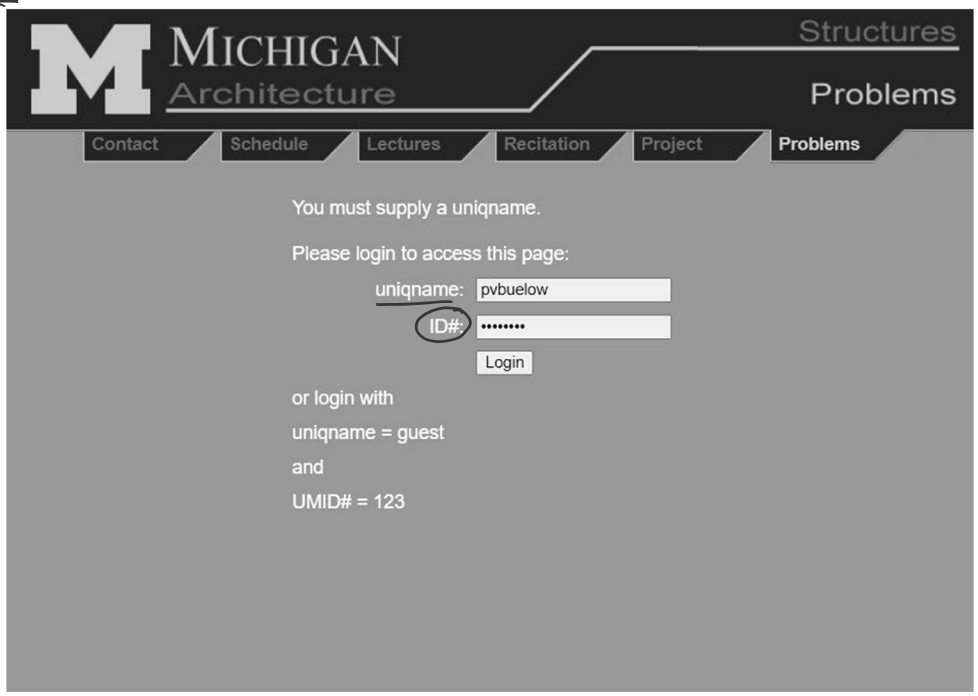


Tower Test

Computer Problems

Uniqname

UM ID Number



Computer Problems

Problem Menu

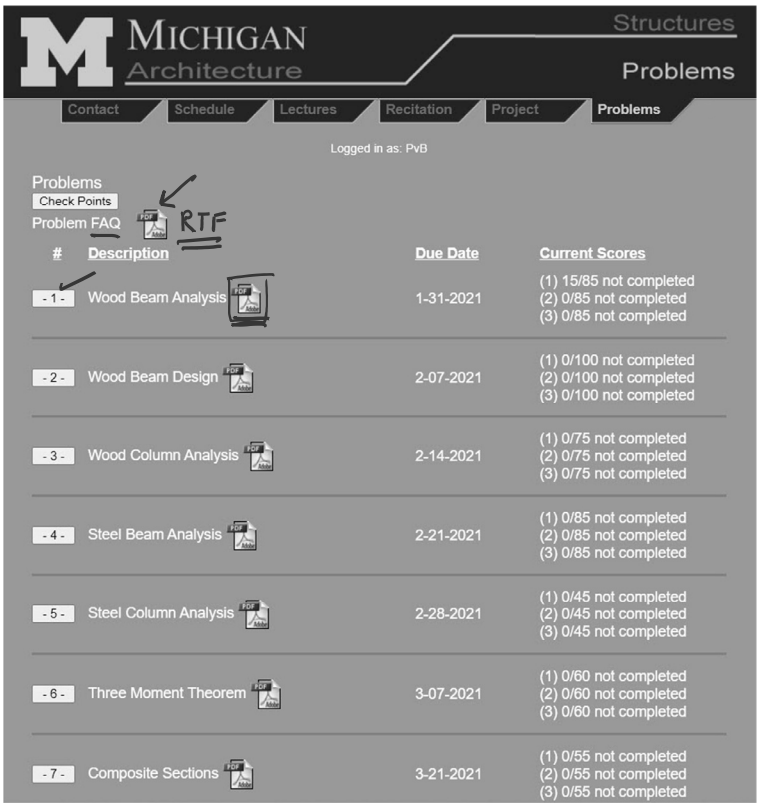
Check Grades

Problem FAQ

Select Problem

Download Instructions

Work Problem (3 versions)



Computer Problems

Problem Page

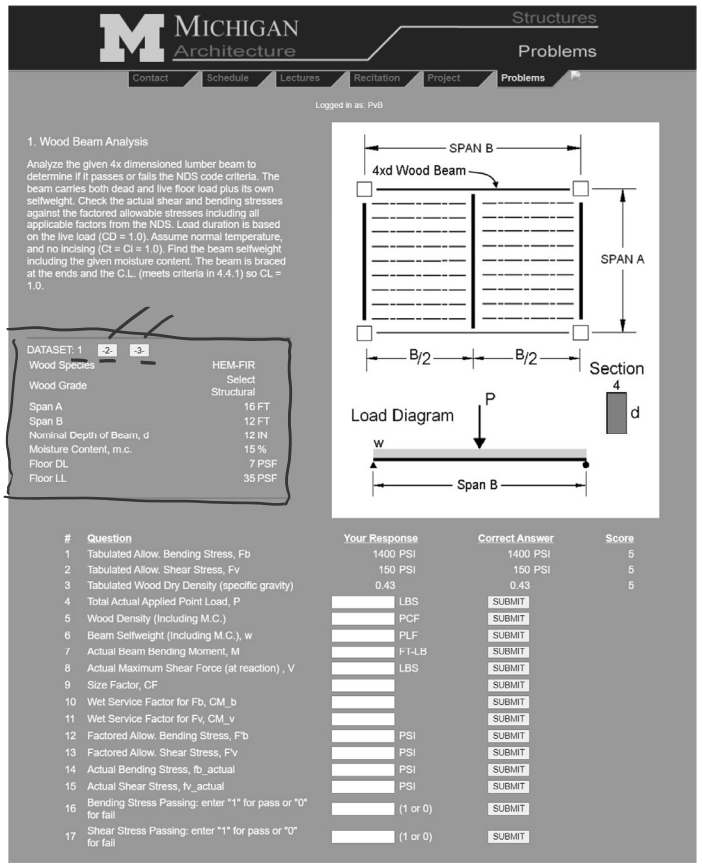
Choose Data Set

Enter Answers

Submit

Read Score

Correct if Necessary



Tips on how engineering students study for exams