CALIFORNIA STATE UNIVERSITY, SACRAMENTO

College of Engineering and Computer Science

Construction Management Program

CM 130
Structures I: Design Principles & Structural Steel
Course Syllabus
Fall 2008

Instructor: Professor Mikael Anderson, PE

Lecture 7:30 a.m. - 8:45 a.m. T, Th
ARC 1009

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W 11:00 a.m. – 1:00 p.m.
or by appointment

CM 130: Design Principles & Structural Steel

COURSE DESCRIPTION:
An introduction to structural analysis & design, with the consideration of load conditions, stresses, strains, beam deflections, and column action. Basic design of structural steel members with an emphasis on systems used in practical situations. Beams, trusses, and columns are designed using the Uniform Building Code as a reference and the results are shown on detailed drawings and sketches. **3 units.**

PREREQUISITES:
The prerequisite course(s) for this class, which must have been completed with a C- or better grade, include CM 30 & CM 40. One hundred series CM courses are limited to students whose changes of major to the upper division have been approved by the Program Coordinator.

ACADEMIC HONESTY & GRADING SYSTEM:
All students are subject to the policies described in the University Catalogue. In particular, students should be familiar with policies described on pages 104 – 112 and page 339 of the 2004-2006 CSUS Catalogue.

Giving aid to a student during an exam or taking information from another student or student's exam constitutes academic dishonesty. Students caught cheating during an exam will receive a failing grade in the course and can be dismissed from the university. Students are encouraged to work together to solve homework problems, but **copying is obviously prohibited.**

Grades will be assigned based on the student's performance as measured by the assigned homework, midterm exams, and final exam. Grading shall be in accordance with the University's grading policy as outlined in the section entitled "Grading System" in the current copy of the University catalog.

Grade Scale:
A: 90-100 B: 80-89
C: 70-79 D: 60-69
F: <60

Homework	25%
Midterm Exam #1	25%
Midterm Exam #2	25%
Final Exam	25%

*Students achieving overall percentages as shown above are guaranteed grades as indicated. Actual cutoffs may be lower.

COURSE OBJECTIVES:
The purposes of this course are to:

- Determine the various types of design loads for buildings and other types of structures
- Follow the load path throughout an entire structure
- Calculate the external, internal and reaction forces all components of a structure
- Properly size structural steel beams, columns, braces and connections based on the demand loads to these components and the material capacity

SPECIFIC EDUCATIONAL OUTCOMES:
At the conclusion of the class, students should be able to:

- Figure moments of inertia for simple and composite areas.
- Understand linear stress-strain relationships.
- Calculate design dead & live loads for structures – floor and roof.
- Calculate lateral wind, seismic, and soil loads for structures.
- Use UBC load combinations to figure the worst case loading for structural members.
- Able to use the common beam diagram and formula charts in the AISC steel manual.
- Become proficient with the tributary area method for calculating loads on beams & columns.
- Use the AISC steel manual to figure steel properties for various common steel wide flanges, channels, structural tubes, pipe, and angles.
- Able to properly size the most efficient steel sections from the AISC steel manual, based on design stresses.
- Analyze and design steel braces & columns for tension or compression loads.
- Analyze and design steel beams for bending, shear, and deflection.
- Analyze combined stresses, axial & bending, for columns.
- Design bolted and welded steel connections.
- Strengthen skills for drawing shear and bending moment diagrams.
- Solve problems using fundamental principles in a logical and systematic way.
- Idealize problems using mathematical models.
- Draw free body diagrams.

TEXTBOOKS:

Breyer, Fridley, Cobeen, & Pollock, *Design of Wood Structures*, 6th Ed., McGraw Hill, New York, 2007. Sold in the CSUS bookstore. **(Required)**

Parker & Ambrose, *Simplified Design of Steel Structures*, **7th Edition (not 8th)**, John Wiley & Sons, New York, 1997. Sold in the CSUS bookstore. **(Required)**

AISC Manual Committee, *Manual of Steel Construction: Allowable Stress Design*, 9th Ed., American Institute of Steel Construction (AISC), 1990. Available thru CSUS Construction Management library reserve for current semester only. **(Required)**

REFERENCES:

International Code Council (ICC) & Building Standards Commission, *International Building Code (IBC) – Volume 2: Structural Engineering Design Provisions*, 2007 Ed., International Code Council (ICC), California Modified Version.

ASCE Standard #7-05, *Minimum Design Loads for Buildings and Other Structures*, 2005 Ed., American Society of Civil Engineers (ASCE) Publications, Virginia.

ASCE Standard #37-02, *Design Loads on Structures During Construction*, 2003 Ed., American Society of Civil Engineers (ASCE) Publications, Virginia.

COURSE ORGANIZATION & EVALUATION:

Lecture Sessions

Attendance is strongly recommended. Lecture sessions will be one hour and fifteen minutes in length, and held two times per week. Classes will be devoted to the presentation of lecture topics, a brief review of the assignments, administering exams, and addressing individual questions as time allows. To maximize learning, you are encouraged to participate actively in lecture. You will also have the opportunity to work in small groups to solve problems in/out of the classroom.

Course Web Page

A CM 130 course web page will be developed through the CSUS Web CT. It is **important** for you to have a SacLink account to utilize the tools of this course web page. You will be expected to check your Saclink email and the course web page regularly (i.e., daily) for important class announcements, homework assignments & solutions, and other information. You must send all email to me during the semester with **"CM130" somewhere in the "subject line".** Email without this designation will not be recognized or responded to (i.e., I will assume that it has not been submitted).

Classroom Interruptions

The lecture sessions should be treated in a professional manner, as you would behave during a meeting with a client/contractor. All cellular phones and pagers to be turned off prior to entering lecture sessions and exams. Use of classroom computers during the lecture will also not be allowed. Any violation of these warnings will result in dismissal of the student from that day's lecture.

Homework Policy

Homework problems will be assigned regularly. Assignments must be turned in at the **beginning** of class on the due date, typically two periods after they have been assigned. A maximum of 2 late homeworks will be accepted at the beginning of the next class period, with a **20% penalty**. No homework may be submitted after an assignment is returned or after solutions are provided.

Homework must be neat and organized, and completed using a straight edge and engineering paper (front side only). Final answers must be boxed or underlined for clarity

and **engineering units must be used in solving problems and shown on final answer to receive credit**. Homework sheets must be stapled, with name at the top of each page.

Homework will be reviewed for completion of all assigned problems, but not all of the assigned problems will necessarily be graded. However, solutions of all problems will be posted on Web CT and should be reviewed.

Exams Policy

Two seventy-five minute midterm exams will be given as noted on the exam schedule below. These midterm exams will be returned for review in class, but will be collected and remained on file in the instructor's office for a minimum period of one year. Any appeal on the scoring of an exam must be made at the first lecture period following return of the midterm exam.

A two hour final exam will be given as determined by the University Final Exam Schedule (noted on the exam schedule below). Final exams will not be returned, but will remain on file in the instructor's office for a minimum period of one year. During this time, the student may schedule an appointment with the instructor to review his/her final exam.

Exam Dates (tentative)

Midterm Exam #1	Thursday, October 16th	(Week 7)
Midterm Exam #2	Thursday, November 20th	(Week 12)
Final Exam	TBD	

Students may bring the AISC steel manual along with one 8.5 x 11 sheet (both sides) to the first exam, and an additional sheet for each subsequent exam. These sheets must be your own hand written notes. The instructor will collect and review these sheets. Makeup exams will be given only if *prior permission* is granted for extreme situations such as valid medical reasons.

Evaluations

Students are encouraged to provide constructive feedback to the instructor during the semester through "student representatives" and will also formally evaluate the instructor during the last week of class using the standard evaluation form.

Course Binders

All students are required to submit a neatly compiled three-ring binder, with divider tabs, all course notes, assignments, handouts, quizzes, exams, and other course work. Binders will be returned to the students following the ACCE accreditation visit in Spring 2009. Failure to produce and submit this binder will result in a failing grade in the class.

CM 130 – LECTURE SCHEDULE (Tentative)
Fall 2008

Week	Lecture	Topic	Reference
1	1	Introduction & Moments of Inertia	Statics Text
	2	Beam Section Properties	Statics Text
2	3	Intro to Steel Manual	AISC Manual
	4	Intro to Beam Diagram and Formulas	AISC Manual
3	5	Tributary Area	Handouts
	6	Dead Loads	Wood Text, Pg 2.3 – 2.7
4	7	Live loads on floors & roofs	Wood Text, Pg 2.7 – 2.14
	8	Snow load on roofs, & Soil loads	Wood Text, Pg 2.14 – 2.21
5	9	Lateral loads – wind	Wood Text, Pg 2.23 – 2.42
	10	Lateral loads – wind	
6	11	Lateral loads – seismic	Wood Text, Pg 2.42 – 2.73
	12	Lateral loads – seismic	
7	13	Distribution of Loads thru Building Systems	Wood Text, Chapter 3
	14	**Midterm #1: DESIGN LOADS**	
8	15	Introduction to steel properties and stress-strain diagrams	Steel Text, Chapter 3 & 5
	16	Introduction to AISC Manual, code and commentary	AISC Manual
9	17	Design of tension members, including stresses	Steel Text, Chapter 10
	18	Design of tension members, including stresses	
10	19	Design of pure compression members, including stresses	Steel Text, Chapter 7
	20	Design of pure compression members, including stresses	
11	21	Design of beams, including flexural stress, shear stress and beam deflections	Steel Text, Chapter 6
	22	Design of beams, including flexural stress, shear stress and beam deflections	
12	23	Design of girders	Steel Text, Chapter 6
	24	**Midterm #2: STEEL DESIGN**	
13	25	Design of columns subjected to axial loads and moments, & combined axial and bending	Steel Text, Chapter 7
	26	**HOLIDAY – Thanksgiving Day**	
14	27	Design of bolted connections	Steel Text, Chapter 11
	28	Design of bolted connections	
15	29	Design of welded connections	Steel Text, Chapter 11
	30	Design of welded connection	

DISCLAIMER: The instructor reserves the right to adjust the scope of the course, including number and timing of exams, as necessary.