CM330
Statics and Strength of Materials
[Onsite]

Course Description:

This course is a study of stresses, deflections and static loads in members and simple structural systems. Emphasis is given to the application of building structures.

Prerequisite(s) and/or Corequisite(s):

Prerequisites: CD220 Materials and Processes, GE253 Physics or equivalent.

Credit hours: 4

Contact hours: 50 (30 Theory Hours, 20 Lab Hours)

CM330 Statics and Strength of Materials

SYLLABUS

 Date: 9/1/2011

Credit hours: 4

Contact /Instructional hours: 50 (30 Theory, 20 Lab)

Prerequisites: CD220 Materials and Processes, GE253 Physics or Equivalent

Corequisite(s): None

Course Revision Table

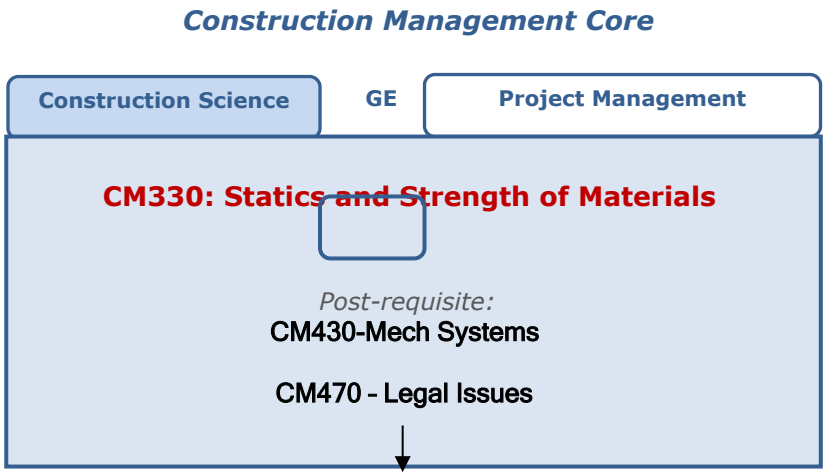
Change Date	Updated Section	Change Description	Change Rationale	Implementation Quarter
09/01/2011	All	New Curriculum		Sept 2011

Where Does This Course Belong?

This course is required for the Construction Management program. This program covers the following core areas:

- Construction Science
- General Education (GE)
- Project Management

The following diagram demonstrates how this course fits in the program:



Course Summary

Major Instructional Areas

1. Properties and resultants of forces
2. Resolution and composition of forces
3. Analysis of nonconcurrent force systems
4. Laws of equilibrium
5. Loads, reactive forces, and load combinations
6. Stress and deformation
7. Modulus of elasticity and strain
8. Analysis of planar trusses
9. Shear and bending
10. Structural systems

Course Objectives

This course has the following instructional objectives:

1. Resolve vector-related problems using the concepts of force components and combinations.
2. Analyze concurrent and nonconcurrent force systems algebraically to compute values for moments.
3. Analyze a force system to determine if it is in equilibrium.
4. Analyze a force system to determine the stress and strain that applies to it.
5. Examine effective beam and column loading using the concepts of Hooke's Law, elastic limit, ultimate strength, factors of safety, and modulus of elasticity.

6. Create free-body diagrams to determine reactions and member loads.
7. Evaluate the behavior of truss and framing systems.
8. Analyze the shear and bending moments acting along a beam.
9. Design simple wooden structural systems.
10. Design simple steel and concrete structural systems.

Learning Outcomes

Upon completion of this course, the students are expected to:

1. Add vectors using force components and combinations.
2. Subtract vectors using force components and combinations.
3. Resolve a vector into X and Y components.
4. Add components of vectors to find a resultant vector.
5. Evaluate the magnitude of a moment.
6. Examine reactive forces for a given scenario on beam loading.
7. Write moment equations for a given scenario on beam loading.
8. Calculate the stress for a given section of a beam.
9. Calculate the strain or deformation for a given section of a beam.
10. Find the values of strain for given values of stress.
11. Create stress/strain diagrams for given values of load.
12. Draw the free-body diagram for a structural member.
13. Find out support reactions for a truss.
14. Find out the stress on a truss structural member.
15. Compute the shear at a given point of a beam.
16. Compute the moment along the length of a beam.
17. Find out the maximum shear for different load configurations on beams.
18. Find out the maximum moment for different load configurations on beams.
19. Size wooden beams used in the construction of a building.
20. Size wooden columns used in the construction of a building.
21. Determine the column spacing for steel construction projects.
22. Size the steel columns used in a construction project.

23. Size the concrete columns used in a construction project.

Learning Materials and References

Required Resources

Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Ambrose, J., & Tripeny, P. (2011). *Simplified engineering for architects and builders* (11th ed.). Hoboken, NJ: John Wiley & Sons.	■		■
Student Companion Web site: http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0470436271&bcsId=5904	■		

Recommended Resources

Professional Associations

- The Associated General Contractors of America (AGC)

  AGC is the leading association for the construction industry. This Web site provides the opportunity to interact with a community of privacy professionals and to learn from their experiences.
  http://www.agc.org/ (accessed July 29, 2011)

ITT Tech Virtual Library (accessed via Student Portal)

- School of Study> School of Drafting and Design> Professional Organization
  - American Institute of Architects
  - American Institute of Constructors
  - Associated Builders and Contractors

- School of Study> School of Drafting and Design> Recommended Links
    - Construction Weblinks
- School of Study> School of General Education> Recommended Links
    - Practical Algebra Lessons from Purplemath
    - Intute: Physics

Information Search

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Properties of forces
- Concurrent force systems
- Nonconcurrent force systems
- Laws of equilibrium
- Modulus of elasticity
- Stress and strain
- Shear and bending
- Free body diagram
- Beam design
- Column design

NOTE: All links are subject to change without prior notice.

Course Plan

Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
▪ Do take a proactive learning approach ▪ Do share your thoughts on critical issues and potential problem solutions ▪ Do plan your course work in advance ▪ Do explore a variety of learning resources in addition to the textbook ▪ Do offer relevant examples from your experience ▪ Do make an effort to understand different points of view ▪ Do connect concepts explored in this course to real-life professional situations and your own experiences	▪ Don't assume there is only one correct answer to a question ▪ Don't be afraid to share your perspective on the issues analyzed in the course ▪ Don't be negative about the points of view that are different from yours ▪ Don't underestimate the impact of collaboration on your learning ▪ Don't limit your course experience to reading the textbook ▪ Don't postpone your work on the course deliverables – work on small assignment components every day

Course Outline

Unit #	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
1	Forces	Problem Set	Vector Addition, Subtraction, and Component Resolution	3%
		Assignment	Application of Vector Addition, Subtraction, and Component Resolution	3%
Unit 1 Reading Assignment: Ambrose et al., Pages 1-7 and Pages 11-15				
2	Force Systems	Problem Set	Concurrent and Nonconcurrent Vector Problems	3%
		Assignment	Application of Concurrent and Nonconcurrent Vector Problems	3%
Unit 2 Reading Assignment: Ambrose et al., Pages 15-29				
3	Laws of Equilibrium	Problem Set	Advanced Vector Addition, Subtraction, and Component Resolution	3%
		Assignment	Application of Advanced Vector Addition, Subtraction, and Component Resolution	3%
Unit 3 Reading Assignment: Ambrose et al., Pages 29-54				
4	Stress and Deformation	Quiz	Quiz 1	10%
		Problem Set	Stress, Strain, and Deformation	3%
		Assignment	Application of Stress, Strain, and Deformation	3%
Unit 4 Reading Assignment: Ambrose et al., Pages 55-59				
5	Modulus of Elasticity and Strain	Problem Set	Modulus of Elasticity and Strain	3%
		Assignment	Application of the Modulus of Elasticity and Strain	3%
Unit 5 Reading Assignment: Ambrose et al., Pages 59-65				

Unit #	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
6	Analysis of Planar Trusses	Problem Set	Determination of Reactions at Supports and the Resolution of Member Loading	3%
		Assignment	Application of Reactions and Member Loading	3%
Unit 6 Reading Assignment: Ambrose et al., Pages 65-91				
7	Shear and Bending I	Problem Set	Shear and Moment Calculations	3%
		Assignment	Application of Shear and Moment Calculations	3%
Unit 7 Reading Assignment: Ambrose et al., Pages 92-99				
8	Shear and Bending II	Quiz	Quiz 2	10%
		Problem Set	Shear and Moment Diagrams	3%
		Assignment	Application of Shear and Moment Diagrams	3%
Unit 8 Reading Assignment: Ambrose et al., Pages 99-160				
9	Structural Systems and Planning I	Problem Set	Wooden Structural Members Sizing	3%
		Assignment	Application of Wooden Structural Members	3%
Unit 9 Reading Assignment: Ambrose et al., Pages 161-175				
10	Structural Systems and Planning II	Problem Set	Steel and Concrete Structural Member Sizing	3%
		Assignment	Application of Steel and Concrete Structural Members	3%
Unit 10 Reading Assignment: Ambrose et al., Pages 176-188				
11	Course Review	Exam	Final Exam	20%

Unit #	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	and Final Exam			

Evaluation and Grading

Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	Weight
Problem Set	30%
Assignment	30%
Quiz	20%
Exam	20%
TOTAL	**100%**

Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage	Credit
A	90–100%	4.0
B+	85–89%	3.5
B	80–84%	3.0
C+	75–79%	2.5

C	70–74%	2.0
D+	65–69%	1.5
D	60–64%	1.0
F	<60%	0.0

Academic Integrity

All students must comply with the policies that regulate all forms of academic dishonesty, or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

(End of Syllabus)

