

Syllabus

CVEEN 3210-301 Structural Loads & Analysis

Instructor: Roshina Babu	Pre-requisites: Yes
Department: Civil and Environmental Engineering	Credit Hours: 3
Office: U748	Semester: Spring 2021
Class Hours: 1:00 to 1: 50 PM (M,W,F)	Location: UAC 508
Communication & Office Hours: Review the "Communication" section below for more information.	

Course Description

Overview

Course	CVEEN 3210-301 Structural Loads and Analysis
Department	Department of Civil and Environmental Engineering
Pre-Requisites	"C" or better in CVEEN 2140 AND Full Major status in (Civil Engineering OR Construction Engineering)
Credit Hours	3
Semester	Spring 2021
Description	Structural design loads with emphasis on application of specifications, analysis of cables and arches, influence lines for beams and trusses, deflection of structures by double-integration, moment-area, conjugate-beam, and virtual-work methods, introduction to indeterminate structural analysis using slope-deflection, moment-distribution, and approximate techniques.

Role in the Curriculum

Structural Loads and Analysis is a foundational study to a deep and broad set of courses in the civil engineering curriculum. It is the third in a sequence of three courses in solid mechanics (Statics, Mechanics of Materials, and Structural Analysis) within the civil engineering context. Although this course is first and foremost on the analytical side, it introduces the design process and professional practice, and it is prerequisite to each of the structural design courses.

From an engineering accreditation perspective, this course supports and provides direct measurement of a student's ability to:

- 1(a) Formulate a problem statement and identify critical elements such that the problem is clearly understood,
 - 1(b) Apply engineering, science or mathematical principles to achieve analytical or numerical solutions to model equations (formulate & solve).
- Apply computer tools to model and achieve numerical solutions to problems.

Syllabus

- Loads and Structure Idealization
- Predicting Results
- Internal Force Diagrams
- Deformations and Displacements
- Computer Aided Analysis
- Approximate Analysis

Course Objectives

Upon completion of this course, the successful student will be able to:

1. Identify and classify structural systems, sub-systems, and components.
2. Identify the participants and roles of responsibilities in structural engineering design and construction.
3. Compute internal forces for members and support reactions of structural systems.
4. Construct internal force diagrams for members in structural systems.
5. Create models for and calculate anticipated deflections of structures and their components.
6. Develop basic computer models of a given structural situation.
7. Estimate structural analysis results and evaluate the reasonableness of the estimates and results of more complete (analytical or numerical) models.

Required Materials

The textbook for this course will be:

- Structural Analysis: Skills for Practice, 1/e, Jim Hanson, Pearson, 2019

Other materials required:

- Engineering computation paper for hand calculations
- NCEES FE Exam Approved Calculator.
- Access to structural analysis software SAP2000 (remote access to CADE labs)

Schedule

This is the tentative schedule, subject to change as the course progresses.

Wk.	Date	Module	Pre-Class Work	Post-Class Work		
				Quiz	Assign.	Discussion
1	22 Feb	Introduction				D1
	24 Feb	Review of Statics and Strength of Materials	Reading/Video List A	CQ1		
	26 Feb	Structural Analysis and Design	Reading/Video List B	CQ2		
2	1 Mar	Independence Day movement Holiday				
	3 Mar	Load Estimations				
	5 Mar	Load Paths	Reading/Video List C	CQ3		D2
3	8 Mar	Gravity Loads	Reading/Video List D	CQ4	PS1	
	10 Mar	Lateral Loads 1	Reading/Video List E			
	12 Mar	Lateral Loads 2		CQ5	PS2	
4	15 Mar	Load Combinations	Reading/Video List F			
	17 Mar	Probabilistic Design	Reading/Video List G		PS3	D3
	19 Mar	Arches	Reading/Video List H	CQ6		
5	22 Mar	Cables	Reading/Video List I	CQ7	PS4	
	24 Mar	Class Test 1				
	26 Mar	Trusses	Reading/Video List J			
6	29 Mar	Computer Models of Trusses 1	Reading/Video List K			D4
	31 Mar	Spring Recess				
	2 Apr	Spring Recess				
7	5 Apr	Computer Models of Trusses 2			PS5	
	7 Apr	Beams and Frames	Reading/Video List L	CQ8		D5
	9 Apr	Computer Models of Beams 1				
8	12 Apr	Computer Models of Beams 2			PS6	
	14 Apr	Computer Models of Frames 1	Reading/Video List M			
	16 Apr	Computer Models of Frames 2			PS7	
9	19 Apr	Deflection of Beams 1	Reading/Video List N	CQ9		
	21 Apr	Deflection of Beams 2				
	23 Apr	Deflections of Beams 3			PS8	D6
10	26 Apr	Deformations of Frames 1	Reading/Video List O	CQ10		
	28 Apr	Deformations of Frames 2			PS9	
	30 Apr	Class Test 2				
11	3 May	Reading Day (No lecture)				
	5 May	Children's Day (Holiday)				
	7 May	Moment Distribution Method 1	Reading/Video List P	CQ11		D7
12	10 May	Moment Distribution Method 2				
	12 May	Moment Distribution Method 3				
	14 May	Moment Distribution Method 4			PS10	
13	17 May	Approximate Methods 1	Reading/Video List Q	CQ12		
	19 May	Buddha's Birthday (Holiday)				
	21 May	Project Presentation				
14	24 May	Approximate Methods 2				
	26 May	Approximate Methods 3	Reading/Video List R			D8
	28 May	Approximate Methods 4			PS11	
15	31 May	Introduction to ILD	Reading/Video List S	CQ13		
	2 Jun	Introduction to Stiffness Methods	Reading/Video List T	CQ14		D9
	4 Jun	Course Summary				
	7-10 Dec	Final Exam				

Communication

Please review the communication methods and requirements for this course:

Preferred Contact Methods

- The easiest way to contact your instructor directly is to use the *Inbox*, located in the far left Canvas menu.
- You can also contact your instructor in the following ways:
 - Email: roshina.babu@utah.edu
 - Phone: 6214 (during office hours)

Office Hours

The instructor will hold office hours according to the following schedule:

- **Day(s)**: Tuesdays, Thursdays
- **Time(s)** 2:00 PM to 3:00 PM **or by appointment**

Virtual Meeting Rooms(s): Zoom meetings can be arranged by appointment.

Response Time: Please contact the instructor in advance if you have any questions. The instructor will respond to you within 48 hours, **not including** weekends and holidays.

Evaluation

Your performance in this course will be evaluated by:

Category	Weight
Class Tests	40%
Final Exam	20%
Assignments	10%
Group Project	10%
Attendance and Participation	20%
Total	100%

Grading

University of Utah grading scale

LETTER	SCORING
A	100% - 94%
A-	93.9% - 90%
B+	89.9%–87%
B	86.9%–84%
B-	83.9% - 80%
C+	79.9%–77%
C	76.9%–74%
C-	73.9% - 70%
D+	69.9%–67%
D	66.9%–64%
D-	63.9% - 60%
E	59.9%–0%