What is CIVL 7117?

Course Title: Finite Element Methods in Structural Mechanics

Course Description:

Structural idealization, stiffness properties of elements, structural analysis of element assemblage; plane stress and strain problems; applications to problems of plates and shells; computer solution of large systems.

What is CIVL 7117?

Prerequisites: Consent of Instructor

Course Meetings:

Monday and Wednesday; 7:10 - 8:35 p.m.
ES 114

What is CIVL 7117?

Instructor:

Dr. Charles Camp, Office: EN 106B
Phone: 678-3169 (office)
Email: cvcamp@memphis.edu

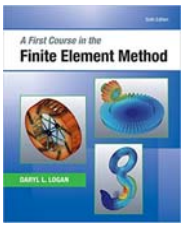
Office hours: *An "open door policy" or by appointment*

What is CIVL 7117?

Required Textbook:

A First Course in the Finite Element Method

by Daryl L. Logan, 2017



ISBN-10: 1305635116
ISBN-13: 978-1305635111

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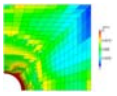
Course Objectives

1. Overview basic concepts of mathematical modeling and discuss the process of converting a structural system into a discrete model.
2. Introduce the stiffness method for spring elements.
3. Develop the formulation for bar elements to solve truss problems.
4. Discuss the concepts of modeling symmetry and bandwidth for truss analysis.

What is CIVL 7117?

Course Objectives

5. Develop the formulation for beam elements to solve beam and plane frame problems.
6. Develop of plane stress and plane strain formulations.
7. Structural dynamics; vibration of a spring–mass system and natural frequencies of beams and frames.
8. Application of the finite element method to problems in structural engineering and mechanics using the **S**tructural **A**nalysis **P**rogram 2000 (SAP2000)



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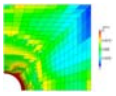
Course Outline by Week

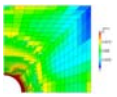
1. Introduction to Finite Elements - Chapter 1
2. Introduction to the Stiffness Method - Chapter 2
3. Development of Truss Equations - Chapter 3
4. Development of Truss Equations with SAP2000 applications; Symmetry, and Bandwidth for Truss Analysis - Chapters 3 and 3b
5. Development of Beam Equations - Chapter 4
6. Development of Beam Equations with SAP2000 applications
7. Development of Plane Frame and Grid Equations - Chapter 5
8. Development of Plane Frame and Grid Equations - Chapter 5
9. **Mid-term Exam**
10. Development of The Plane Stress Element - Chapter 6
11. Practical Consideration on Modeling - Chapter 7
12. Development of Linear Strain Triangles (LST) - Chapter 8
13. Development of Plate Bending Element - Chapter 12
14. Structural Dynamics - Chapter 16
15. **Final Exam**



What is CIVL 7117?

Grading

- Grades will be based on two take-home exams given during the semester and class assignments.
- Homework will be assigned weekly and completed at the discretion of the student.
- A notebook containing all completed homework will be collected at the end of the semester.

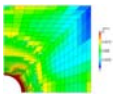


What is CIVL 7117?

Grading

- The final grades for the course will be based on the following percentages:

Components	Percentages
Homework	20%
Mid-Term Exam	40%
Final Exam	40%

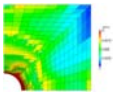


What is CIVL 7117?

Grading

Final letter grades will be based on the following scale which reflects the percentages as noted above.

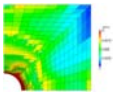
Exam/Homewrok/Projects	Grade
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F



What is CIVL 7117?

Grading

- Regular attendance is necessary to maintain pace with the lectures and the progress of the class.
- If you must be absent, please make sure you know the assignment for the following class meeting.



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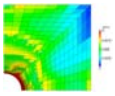
Make-up Work

- Generally, if a student misses an exam a score of zero will be awarded.
- However, the student may be allowed to make–up an exam or turn in their homework notebook late if a valid reason for the absence is presented to the instructor at the next class meeting.
- If a student must miss an exam because of a conflict in their schedule the student must notify the instructor in writing at least two days prior to the absence.



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Any questions?