

CE 422: FINITE ELEMENT METHODS
Fall 2016

Course description: This course introduces students to the finite element method, which is a powerful tool for solving partial differential equations that govern many physical problems. Specific topics include: generalized coordinates; generalized displacements; shape functions; element derivations; element assembly; plane strain and plane stress; convergence criteria; isoparametric formulations; and computer applications.

3 credits. Prerequisites: CE 122 (Structural engineering II) or ME 100 (Stress and applied elasticity)

Required textbook: “*A First Course in the Finite Element Method*” (5th edition) by Daryl L. Logan. Published by Cengage Learning, 2012.

(The ISBN-13 number for this book is: 978-0495668251.)

Class schedule: The class meets once per week for a single 3hr session:

Tuesday 6-9 pm in Rm 503, 41 Cooper Square

Instructor: Neal Simon Kwong, Ph.D.

E-mail: nkwong@cooper.edu

Office: Rm 422, 41 Cooper Square

Office hours: Mon 6-8pm, Thurs 2-4pm, Fri 4:30-6:30pm

Homework: Homework will be assigned generally every week and will be due approximately one week from the date they are assigned at the beginning of class. You may discuss problems with your classmates but your final submission must be done individually; academic dishonesty will not be tolerated. Late homework will not be accepted unless prior arrangements are made before the due date or unless the student has a documented justifiable reason. The homework will be graded and returned, and a solution set will be posted outside of my office after the due date.

Exams: There will be two 150-min examinations throughout the semester. Both exams are closed-book and will be administered in class. Dates are November 1 and December 20. Exams will be based on lecture and homework material. Actual exam dates and specific topics to be tested will be announced in class. Only writing utensils, basic calculators, and a single sheet of handwritten notes (single-sided for exam 1 and double-sided for exam 2) will be allowed in each exam.

Tentative grading: 20% homework, 40% each exam.

Tentative schedule

Date	Class#	Topic	Chapter
9/06	1	Introduction	1, Appendices
9/13	2	FEM based on the stiffness method	2
9/20	3	Analysis of trusses, pt1	3
9/27	4	Analysis of trusses, pt2	3
10/04	5	Analysis of beams, pt1	4
10/11	6	Analysis of beams, pt2	4
10/18	7	Analysis of frames	5
10/25	8	Plane strain and plane stress, pt1	6
11/01	9	Exam 1	1-5
11/08	10	Plane strain and plane stress, pt2	6
11/15	11	Practical considerations in applying the FEM	7
11/22	12	Thurs schedule due to Thanksgiving	N/A
11/29	13	Axisymmetric elements	9
12/06	14	Isoparametric formulations, pt1	10
12/13	15	Isoparametric formulations, pt2; 3D stress analysis; course review	1-7,9-11
12/20	N/A	Exam 2 (Tues 6-9, Rm 503)	1-7,9-11